

**TEST REPORT**

On behalf of

Shanghai Teraoka Electronic Co., Ltd

Product Name: SMART CARD TERMINAL

Model No.: WB-20

FCC ID: 2ARYWWB-20

Prepared For: Shanghai Teraoka Electronic Co., Ltd  
Tinglin Industry Development Zone, Jinshan District  
Shanghai

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File No. : C1D2011005  
Report No. : ACI-F21121  
Date of Test : 2020.11.18 – 2021.04.20  
Date of Report : 2021.05.30

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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## TEST REPORT

Applicant : Shanghai Teraoka Electronic Co., Ltd  
EUT Description : SMART CARD TERMINAL  
(A) Model No. : Refer to Sec.2.1  
(B) Power Supply : DC5V  
(C) Test Voltage : DC5V (Via Adapter)

### Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C  
AND ANSI C63.10-2013  
AND FCC PUBLIC NOTICE DA 00-705, Mar.2000*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT to be technically compliance with the FCC limits.

This report applies to above tested Sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

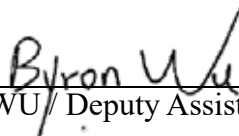
***The test results for EUT's BLE/ WIFI (2.4G)/DFS / WIFI (5G) function are contained in No.ACI-F21108, ACI-F21109, ACI-F21123, ACI-F21122 report.***

Date of Test : 2020.11.18 – 2021.04.20 Date of Report : 2021.05.30

Producer :

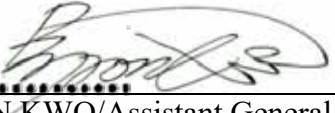
  
JAREY LU / Supervisor

Reviewer :

  
BYRON WU / Deputy Assistant Manager

 For and on behalf of  
Audix Technology (Shanghai) Co., Ltd.

Signatory :

  
Authorized Signature(s) BYRON KWO/Assistant General Manager

# 1 SUMMARY OF STANDARDS AND RESULTS

## 1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

| Description / Test Item                    | Test Standard                                                                                                    | Results | Meets Limit               |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------|---------------------------|
| <b>EMISSION</b>                            |                                                                                                                  |         |                           |
| Conducted Emission Measurement             | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.207                    |
| Radiated Emission Measurement              | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.209(a)<br>15.205(a)(c) |
| 20 dB Bandwidth Measurement                | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.247(a)(1)              |
| Carrier Frequency Separation Measurement   | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.247(a)(1)              |
| Number of Hopping Frequencies Measurement  | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.247(a)(1)(iii)         |
| Dwell Time Measurement                     | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.247(a)(1)(iii)         |
| Maximum Peak Output Power Measurement      | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.247(b)(1)              |
| Band Edge Measurement                      | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.247(d)                 |
| Emission Limitations Measurement           | FCC Rules And Regulations Part 15 Subpart C<br>And ANSI C63.10:2013<br>And FCC Public Notice DA 00-705, Mar.2000 | Pass    | 15.247(d)                 |
| N/A is an abbreviation for Not Applicable. |                                                                                                                  |         |                           |

## 2 GENERAL INFORMATION

### 2.1 Description of Equipment Under Test

Description : SMART CARD TERMINAL

Type of EUT : ☒ Production ☐ Pre-product ☐ Pro-type

Model Number : WB-20

Radio Tech : BT 4.2  
IEEE 802.11 a/b/g/n/ac

Channel Freq. : BLE: 2402MHz-2480MHz;  
BT: 2402MHz-2480MHz  
IEEE 802.11a:  
5180MHz—5240MHz; 5260MHz—5320MHz  
5500MHz—5700MHz; 5745MHz—5825MHz  
IEEE 802.11ac VHT20:  
5180MHz—5240MHz; 5260MHz—5320MHz  
5500MHz—5700MHz; 5745MHz—5825MHz  
IEEE 802.11ac VHT40:  
5190MHz—5230MHz; 5270MHz—5310MHz  
5510MHz—5670MHz; 5755MHz—5795MHz  
IEEE 802.11ac VHT80:  
5210MHz, 5290MHz; 5530MHz—5610MHz; 5775MHz  
IEEE 802.11b: 2412MHz—2462MHz  
IEEE 802.11g: 2412MHz—2462MHz  
IEEE802.11nHT20:  
2412MHz—2462MHz;  
5180MHz—5240MHz; 5260MHz—5320MHz  
5500MHz—5700MHz; 5745MHz—5825MHz  
IEEE802.11nHT40:  
5190MHz—5230MHz; 5270MHz—5310MHz  
5510MHz—5670MHz; 5755MHz—5795MHz

Modulation : BLE: GFSK;  
BT: FHSS, GFSK, DPSK, DQPSK;  
802.11b: DSSS (CCK, DQPSK, DBPSK);  
802.11a/g/n: OFDM (64QAM, 16QAM, QPSK, BPSK);  
802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK).

Antenna Info : Antenna Type: SMA Antenna  
Antenna Gain: 5 dBi  
The Antenna was an antenna that uses a unique coupling to the intentional radiator that is comply with 15.203 requirement.

Applicant : Shanghai Teraoka Electronic Co., Ltd  
Tinglin Industry Development Zone, Jinshan District,  
Shanghai

Manufacturer : same as Applicant

Factory : same as Applicant

## 2.2 EUT Specifications Assessed in Current Report

| Mode | Modulation     | Data Rate(Mbps) |
|------|----------------|-----------------|
| DH1  | GFSK           | Up to3          |
| DH3  | $\pi/4$ -DQPSK | Up to3          |
| DH5  | 8DPSK          | Up to3          |

| Channel List |                 |             |                 |
|--------------|-----------------|-------------|-----------------|
| Channel No.  | Frequency (MHz) | Channel No. | Frequency (MHz) |
| 00           | 2402            | 40          | 2442            |
| 01           | 2403            | 41          | 2443            |
| 02           | 2404            | 42          | 2444            |
| ...          | ...             | ...         | ...             |
| ...          | ...             | ...         | ...             |
| ...          | ...             | ...         | ...             |
| 37           | 2439            | 76          | 2478            |
| 38           | 2440            | 77          | 2479            |
| 39           | 2441            | 78          | 2480            |

## 2.3 Test Information

The test software “RFTextTool.apk” was used to control EUT work in TX mode, Power Setting and select test channel.

| Modulation | data rate (Mbps) | Power Setting | Test Channel |    | Frequency (MHz) |
|------------|------------------|---------------|--------------|----|-----------------|
| DH1        | 1                | Default       | Low:         | 00 | 2402            |
|            |                  | Default       | Middle:      | 39 | 2441            |
|            |                  | Default       | High:        | 78 | 2480            |
| DH3        | 1                | Default       | Low:         | 00 | 2402            |
|            |                  | Default       | Middle:      | 39 | 2441            |
|            |                  | Default       | High:        | 78 | 2480            |
| DH5        | 1                | Default       | Low:         | 00 | 2402            |
|            |                  | Default       | Middle:      | 39 | 2441            |
|            |                  | Default       | High:        | 78 | 2480            |
| 3DH1       | 3                | Default       | Low:         | 00 | 2402            |
|            |                  | Default       | Middle:      | 39 | 2441            |
|            |                  | Default       | High:        | 78 | 2480            |

|      |   |         |         |    |      |
|------|---|---------|---------|----|------|
| 3DH3 | 3 | Default | Low:    | 00 | 2402 |
|      |   | Default | Middle: | 39 | 2441 |
|      |   | Default | High:   | 78 | 2480 |
| 3DH5 | 3 | Default | Low:    | 00 | 2402 |
|      |   | Default | Middle: | 39 | 2441 |
|      |   | Default | High:   | 78 | 2480 |

## 2.4 Sample Description

| Test Item          | Model Number | Sample Number   | Date of receipted |
|--------------------|--------------|-----------------|-------------------|
| Conducted Emission | WB-20        | E20111479-04/04 | 2021.11.02        |
| Radiated Emission  | WB-20        | E20111479-04/04 | 2021.11.02        |
| Conducted RF Test  | WB-20        | E20111479-04/04 | 2021.11.02        |

## 2.5 Supported equipment

Brand : HUAWEI  
 Product Name: : Adaptor  
 Model Name : HW-050200C01

## 2.6 Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.  
 Site Location : 3F and 4F, 34Bldg, 680 Guiping Rd.,  
 Caohejing Hi-Tech Park,  
 Shanghai 200233, China.  
 Accredited by NVLAP, Lab Code : 200371-0  
 FCC Designation Number : CN5027  
 Test Firm Registration Number : 954668

### 3 CONDUCTED EMISSION MEASUREMENT

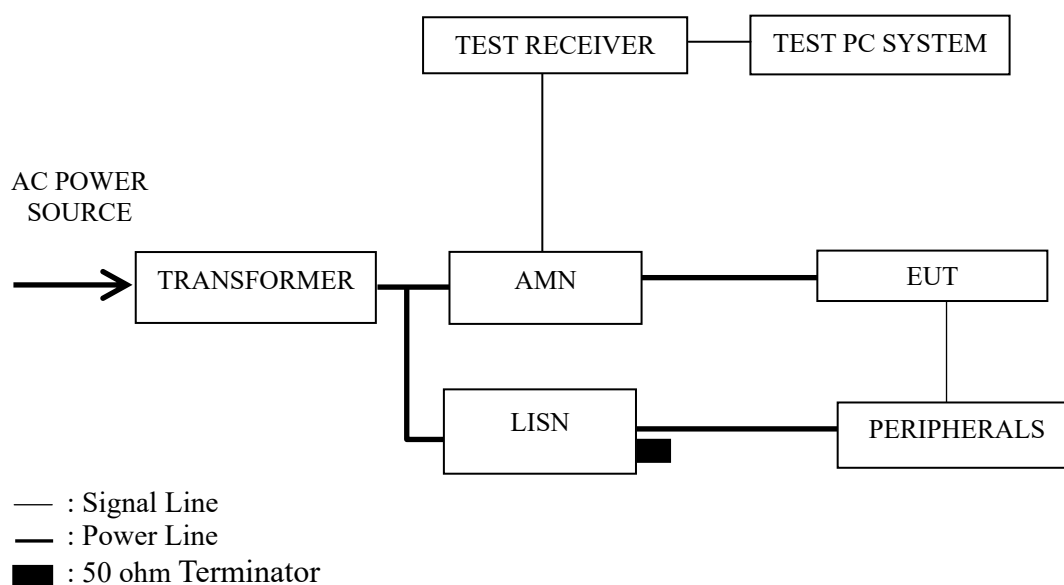
#### 3.1 Test Equipment

The following test equipment are used during the conducted emission test in a shielded room:

| Item | Type                           | Manufacturer | Model No. | Serial No.  | Cal. Date  | Cal. Interval |
|------|--------------------------------|--------------|-----------|-------------|------------|---------------|
| 1.   | Test Receiver                  | R&S          | ESCI      | 100841      | 2021.02.11 | 1 Year        |
| 2.   | Artificial Mains Network (AMN) | R&S          | ESH2-Z5   | 843890/011  | 2021.01.06 | 1 Year        |
| 3.   | Software                       | Audix        | e3        | 6.2009-1-15 | --         | --            |

#### 3.2 Block Diagram of Test Setup

##### 3.2.1 Conducted Disturbance Test Setup



#### 3.3 Conducted Emission Limits (§15.207)

| Frequency (MHz) | Conducted limits (dB $\mu$ V) |            |
|-----------------|-------------------------------|------------|
|                 | Quasi-peak                    | Average    |
| 0.15 ~ 0.5      | 66 to 56 *                    | 56 to 46 * |
| 0.5 ~ 5         | 56                            | 46         |
| 5 ~ 30          | 60                            | 50         |

NOTE 1 - \*Decreases with the logarithm of the frequency.

NOTE 2 - Emission Level dB ( $\mu$ V/m) = 20 log Emission Level ( $\mu$ V/m)

NOTE 3 - The tighter limit applies at the band edges.

### 3.4 Operating Condition of EUT

3.4.1 Setup the EUT as shown in Sec. 3.2.

3.4.2 Turn on the power of all equipment.

3.4.3 Turn the EUT on the test mode, and then test.

### 3.5 Test Procedures

The EUT was placed upon a non-metallic table, which is 0.8 m above the horizontal conducting ground plane and 0.4 m from a vertical reference plane. The EUT was connected to the power mains through an Artificial Mains Network (AMN) to provide a 50  $\Omega$  coupling impedance for the measuring equipment. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission according to FCC Part 15 Subpart C and ANSI C63.10: 2013 requirements during conducted disturbance test.

The I.F. bandwidth of Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

Test with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. (According to KDB 174176 D01 Line Conducted FAQ)

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.6

### 3.6 Test Results

**<PASS>**

The frequency and amplitude of the highest conducted emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Worst case emission:

| No. | Operation    | Modulation | Channel | Frequency (MHz) | Data Page |
|-----|--------------|------------|---------|-----------------|-----------|
| 1.  | Transmitting | --         | --      | --              | P11       |

NOTE 1 – Level = Read Level + AMN Factor + Cable Loss

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – The emission levels which not reported are too low against the official limit.

**Worst case emission**

EUT : SMART CARD TERMINAL Temperature : 22°C

Model No. : WB-20 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2020.12.13

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | AMN Factor (dB/m) | Cable Loss (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-------------------|-----------------|--------------------------|------------------|-------------|---------|
| Line         | 0.1565          | 39.79                 | 0.08              | 0.08            | 39.95                    | 65.65            | 25.7        | QP      |
|              | 0.1565          | 27.78                 | 0.08              | 0.08            | 27.94                    | 55.65            | 27.71       | Average |
|              | 0.3712          | 45.5                  | 0.09              | 0.18            | 45.77                    | 58.47            | 12.7        | QP      |
|              | 0.3712          | 43.2                  | 0.09              | 0.18            | 43.47                    | 48.47            | 5           | Average |
|              | 0.743           | 40.44                 | 0.11              | 0.16            | 40.71                    | 56               | 15.29       | QP      |
|              | 0.743           | 32.23                 | 0.11              | 0.16            | 32.5                     | 46               | 13.5        | Average |
|              | 1.065           | 35.9                  | 0.11              | 0.14            | 36.15                    | 56               | 19.85       | QP      |
|              | 1.065           | 27.92                 | 0.11              | 0.14            | 28.17                    | 46               | 17.83       | Average |
|              | 2.707           | 30.37                 | 0.15              | 0.17            | 30.69                    | 56               | 25.31       | QP      |
|              | 2.707           | 24.34                 | 0.15              | 0.17            | 24.66                    | 46               | 21.34       | Average |
|              | 13.989          | 26                    | 0.18              | 0.13            | 26.31                    | 60               | 33.69       | QP      |
|              | 13.989          | 16.7                  | 0.18              | 0.13            | 17.01                    | 50               | 32.99       | Average |
| Neutral      | 0.1549          | 41.04                 | 0.09              | 0.08            | 41.21                    | 65.74            | 24.53       | QP      |
|              | 0.1549          | 26.99                 | 0.09              | 0.08            | 27.16                    | 55.74            | 28.58       | Average |
|              | 0.3465          | 41.19                 | 0.1               | 0.17            | 41.46                    | 59.05            | 17.59       | QP      |
|              | 0.3465          | 27.16                 | 0.1               | 0.17            | 27.43                    | 49.05            | 21.62       | Average |
|              | 0.7274          | 37.46                 | 0.12              | 0.16            | 37.74                    | 56               | 18.26       | QP      |
|              | 0.7274          | 27.13                 | 0.12              | 0.16            | 27.41                    | 46               | 18.59       | Average |
|              | 1.032           | 35.78                 | 0.13              | 0.14            | 36.05                    | 56               | 19.95       | QP      |
|              | 1.032           | 23.57                 | 0.13              | 0.14            | 23.84                    | 46               | 22.16       | Average |
|              | 3.436           | 27.79                 | 0.19              | 0.18            | 28.16                    | 56               | 27.84       | QP      |
|              | 3.436           | 20.4                  | 0.19              | 0.18            | 20.77                    | 46               | 25.23       | Average |
|              | 13.551          | 34.32                 | 0.41              | 0.13            | 34.86                    | 60               | 25.14       | QP      |
|              | 13.551          | 23.93                 | 0.41              | 0.13            | 24.47                    | 50               | 25.53       | Average |

TEST ENGINEER: Jarey

## 4 RADIATED EMISSION MEASUREMENT

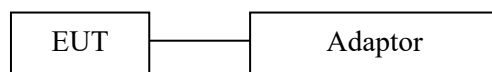
### 4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

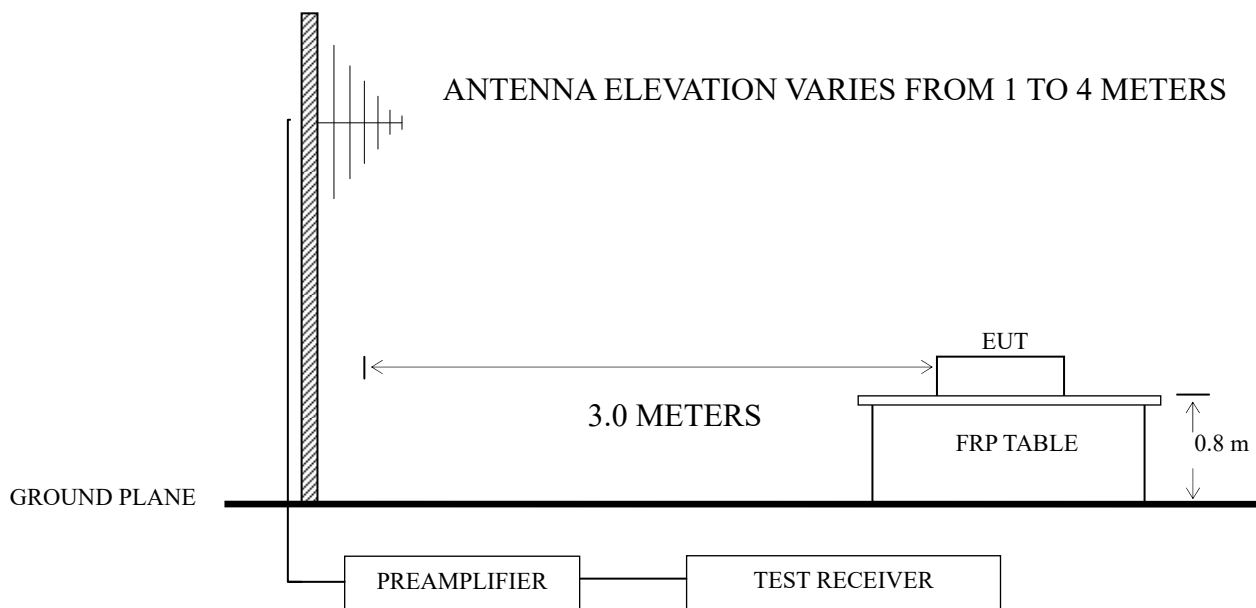
| Item | Type                         | Manufacturer | Model No.             | Serial No.          | Cal. Date  | Cal. Interval |
|------|------------------------------|--------------|-----------------------|---------------------|------------|---------------|
| 1.   | Preamplifier                 | Agilent      | 8447D                 | 2944A10548          | 2021.03.08 | 1 Year        |
| 2.   | Preamplifier                 | HP           | 8449B                 | 3008A00864          | 2021.03.08 | 1 Year        |
| 3.   | Spectrum Analyzer            | Agilent      | N9010A                | MY52221182          | 2020.09.16 | 1 Year        |
| 4.   | Test Receiver                | R&S          | ESCI                  | 101303              | 2021.03.08 | 1 Year        |
| 5.   | Bilog Antenna+6dB Attenuator | Schwarz beck | VULB 9168+EMCI-N-6-06 | 708+AT-N0638        | 2020.07.06 | 1 Year        |
| 6.   | Horn Antenna                 | EMCO         | 3115                  | 9607-4878           | 2020.07.13 | 1 Year        |
| 7.   | Horn Antenna                 | EMCO         | 3116                  | 00062643            | 2020.09.08 | 1 Year        |
| 8.   | Cavity Band Rejection Filter | Microwave    | WT-A3882-R-10         | WT200312-1-1        | 2020.07.07 | 1 Year        |
| 9.   | Software                     | Audix        | e3                    | SET00200 9912M295-2 | --         | --            |

### 4.2 Block Diagram of Test Setup

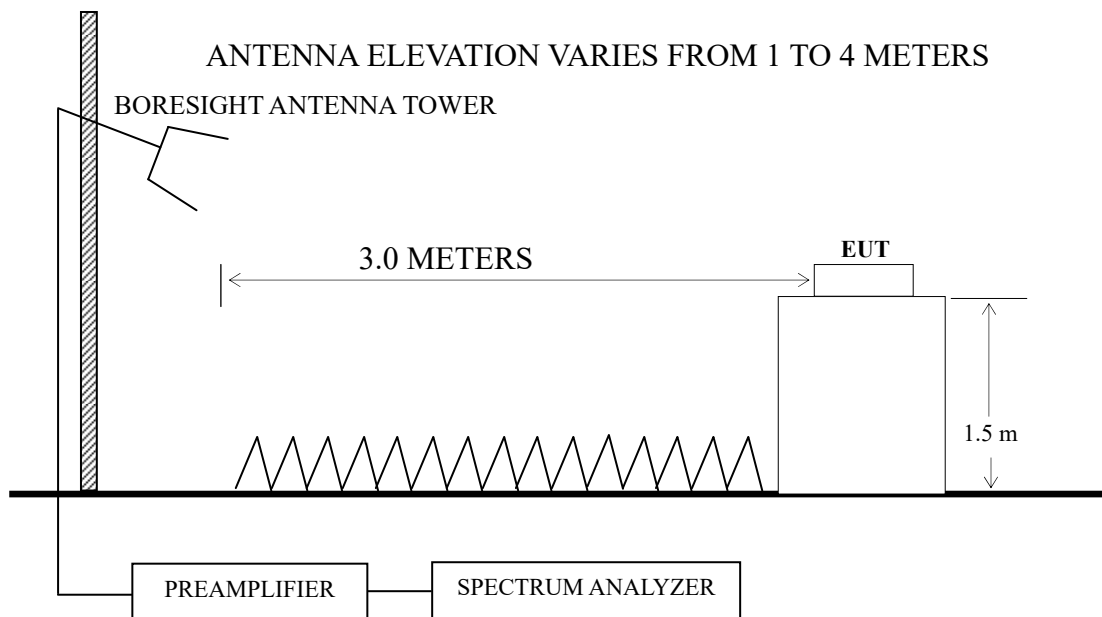
#### 4.2.1 EUT & Peripherals



#### 4.2.2 Below 1GHz



### 4.2.3 Above 1GHz



### 4.3 Radiated Emission Limit (§15.209)

| Frequency<br>(MHz) | Distance<br>(m) | Field strength limits ( $\mu\text{V/m}$ ) |                            |
|--------------------|-----------------|-------------------------------------------|----------------------------|
|                    |                 | ( $\mu\text{V/m}$ )                       | $\text{dB}(\mu\text{V/m})$ |
| 30 ~ 88            | 3               | 100                                       | 40.0                       |
| 88 ~ 216           | 3               | 150                                       | 43.5                       |
| 216 ~ 960          | 3               | 200                                       | 46.0                       |
| Above 960          | 3               | 500                                       | 54.0                       |

NOTE 1 - Emission Level  $\text{dB}(\mu\text{V/m}) = 20 \log \text{Emission Level}(\mu\text{V/m})$

NOTE 2 - The tighter limit applies at the band edges.

NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.

NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

### 4.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.4.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

## 4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 4.2.

4.5.2 Turn on the power of all equipment.

4.5.3 Turn the EUT on the test mode, and then test.

## 4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable. Below 1 GHz, the table height is 80 cm above the reference ground plane. Above 1 GHz, the table height is 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bi-log Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10: 2013 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emission above 1GHz for Spectrum Agilent N9010A.

The frequency range from 30 MHz to 25 GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked.

All the test results are listed in Sec.4.7

## 4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Frequency range: below 1G (Worst case emission)

| No. | Operation    | Modulation | Channel | Frequency (MHz) | Data Page |
|-----|--------------|------------|---------|-----------------|-----------|
| 1.  | Transmitting | --         | --      | --              | P17       |

Frequency range: above 1G

| No. | Operation    | Modulation | Channel | Frequency (MHz) | Data Page |
|-----|--------------|------------|---------|-----------------|-----------|
| 1.  | Transmitting | BT DH1     | 00      | 2402            | P18       |
| 2.  |              |            | 39      | 2441            | P18       |
| 3.  |              |            | 78      | 2480            | P19       |
| 4.  |              |            | Hopping |                 | P19       |
| 5.  |              | BT DH3     | 39      | 2441            | P20       |
| 6.  |              |            | Hopping |                 | P20       |
| 5.  |              | BT DH5     | 39      | 2441            | P21       |
| 7.  |              |            | Hopping |                 | P21       |
| 8.  |              | BT 3DH1    | 39      | 2441            | P22       |
| 9.  |              |            | Hopping |                 | P22       |
| 10. |              | BT 3DH3    | 39      | 2441            | P23       |
| 11. |              |            | Hopping |                 | P23       |
| 12. |              | BT 3DH5    | 39      | 2441            | P24       |
| 13. |              |            | Hopping |                 | P24       |

Restricted Frequency bands:

| No. | Operation    | Modulation | Channel | Frequency | Data Page |
|-----|--------------|------------|---------|-----------|-----------|
| 1.  | Transmitting | BT DH1     | 00      | 2402      | P25       |
|     |              |            | 78      | 2480      |           |
| 2.  |              | BT DH3     | 00      | 2402      | P26       |
|     |              |            | 78      | 2480      |           |
| 3.  |              | BT DH5     | 00      | 2402      | P27       |
|     |              |            | 78      | 2480      |           |
| 4.  |              | BT 3DH1    | 00      | 2402      | P28       |
|     |              |            | 78      | 2480      |           |
| 5.  |              | BT 3DH3    | 00      | 2402      | P29       |
|     |              |            | 78      | 2480      |           |
| 6.  |              | BT 3DH5    | 00      | 2402      | P30       |
|     |              |            | 78      | 2480      |           |

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – 0 ° was the table front facing the antenna. Degree is calculated from 0 ° clockwise facing the antenna.

- NOTE 4 – The emission levels which not reported are too low against the official limit.
- NOTE 5 – The emission levels recorded below is data of EUT configured in Lying direction, for Lying direction was the maximum emission direction during the test. The data of Side & Standing direction are too low against the official limit to be reported.
- NOTE 6 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.  
For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
- NOTE 7 – The frequency range 2310-2390MHz & 2483.5-2500MHz were tested for Restricted bands.

**Worst case emission < 1GHz**

EUT : SMART CARD TERMINAL Temperature : 22°C

Model No. : WB-20 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2020.12.20

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 52.76           | 28.02                 | 19.63                 | 0.45            | 28.35                    | 19.75                    | 40               | 20.25       | QP     |
|              | 150.02          | 37.2                  | 19.1                  | 0.59            | 27.74                    | 29.15                    | 43.5             | 14.35       | QP     |
|              | 254.73          | 37.79                 | 17.77                 | 0.76            | 27.41                    | 28.91                    | 46               | 17.09       | QP     |
|              | 300             | 40.4                  | 19                    | 0.88            | 27.35                    | 32.93                    | 46               | 13.07       | QP     |
|              | 450             | 46.8                  | 22.8                  | 1.17            | 27.2                     | 43.57                    | 46               | 2.43        | QP     |
|              | 750             | 40.9                  | 27.5                  | 1.83            | 27.44                    | 42.79                    | 46               | 3.21        | QP     |
| Vertical     | 51.843          | 41.06                 | 19.69                 | 0.45            | 28.35                    | 32.85                    | 40               | 7.15        | QP     |
|              | 66.266          | 40.11                 | 18.11                 | 0.5             | 28.25                    | 30.47                    | 40               | 9.53        | QP     |
|              | 150.01          | 39.86                 | 19.1                  | 0.59            | 27.74                    | 31.81                    | 43.5             | 11.69       | QP     |
|              | 450             | 42.7                  | 22.8                  | 1.17            | 27.2                     | 39.47                    | 46               | 6.53        | QP     |
|              | 600             | 41.5                  | 25.3                  | 1.51            | 27.28                    | 41.03                    | 46               | 4.97        | QP     |
|              | 750             | 41.9                  | 27.5                  | 1.83            | 27.44                    | 43.79                    | 46               | 2.21        | QP     |

TEST ENGINEER: Jarey

**Radiated Emission > 1GHz**

|           |   |                        |                |            |
|-----------|---|------------------------|----------------|------------|
| EUT       | : | SMART CARD<br>TERMINAL | Temperature :  | 22°C       |
| Model No. | : | WB-20                  | Humidity :     | 51%RH      |
| Test Mode | : | Transmitting           | Date of Test : | 2020.12.30 |

**BT DH1: CH00 (2402 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1702            | 44.41                 | 26.34                 | 3.25            | 37.37                    | 36.63                    | 74               | 37.37       | Peak   |
|              | 3565            | 40.03                 | 31.41                 | 4.57            | 37.08                    | 38.93                    | 74               | 35.07       | Peak   |
|              | 5518            | 35.24                 | 34.2                  | 5.83            | 37.05                    | 38.22                    | 74               | 35.78       | Peak   |
|              | 7201            | 34.22                 | 36.03                 | 6.26            | 37.01                    | 39.5                     | 74               | 34.5        | Peak   |
|              | 8479            | 34.6                  | 38.5                  | 6.62            | 36.98                    | 42.74                    | 74               | 31.26       | Peak   |
|              | 9874            | 34.28                 | 38.4                  | 7.33            | 36.96                    | 43.05                    | 74               | 30.95       | Peak   |
| Vertical     | 1612            | 46.21                 | 25.98                 | 3.14            | 37.44                    | 37.89                    | 74               | 36.11       | Peak   |
|              | 3799            | 39.17                 | 32.06                 | 4.7             | 37.08                    | 38.85                    | 74               | 35.15       | Peak   |
|              | 5203            | 36.75                 | 33.68                 | 5.73            | 37.05                    | 39.11                    | 74               | 34.89       | Peak   |
|              | 7030            | 35.1                  | 35.53                 | 6.21            | 37.01                    | 39.83                    | 74               | 34.17       | Peak   |
|              | 8569            | 34.14                 | 38.47                 | 6.69            | 36.98                    | 42.32                    | 74               | 31.68       | Peak   |
|              | 9811            | 34.55                 | 38.4                  | 7.26            | 36.96                    | 43.25                    | 74               | 30.75       | Peak   |

**BT DH1: CH39 (2441 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1711            | 44.9                  | 26.37                 | 3.25            | 37.36                    | 37.16                    | 74               | 36.84       | Peak   |
|              | 3619            | 40.29                 | 31.56                 | 4.59            | 37.08                    | 39.36                    | 74               | 34.64       | Peak   |
|              | 5518            | 36.02                 | 34.2                  | 5.83            | 37.05                    | 39                       | 74               | 35          | Peak   |
|              | 7165            | 35.04                 | 35.9                  | 6.24            | 37.01                    | 40.17                    | 74               | 33.83       | Peak   |
|              | 8740            | 34.13                 | 38.4                  | 6.81            | 36.98                    | 42.36                    | 74               | 31.64       | Peak   |
|              | 9775            | 34.84                 | 38.4                  | 7.26            | 36.96                    | 43.54                    | 74               | 30.46       | Peak   |
| Vertical     | 1801            | 43.68                 | 26.72                 | 3.33            | 37.28                    | 36.45                    | 74               | 37.55       | Peak   |
|              | 3556            | 39.44                 | 31.38                 | 4.57            | 37.08                    | 38.31                    | 74               | 35.69       | Peak   |
|              | 4996            | 37.3                  | 33.3                  | 5.66            | 37.06                    | 39.2                     | 74               | 34.8        | Peak   |
|              | 7156            | 34.77                 | 35.9                  | 6.24            | 37.01                    | 39.9                     | 74               | 34.1        | Peak   |
|              | 8605            | 34.27                 | 38.45                 | 6.69            | 36.98                    | 42.43                    | 74               | 31.57       | Peak   |
|              | 9685            | 35.54                 | 38.4                  | 7.2             | 36.96                    | 44.18                    | 74               | 29.82       | Peak   |

**BT DH1: CH78 (2480 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1702            | 43.91                 | 26.34                 | 3.25            | 37.37                    | 36.13                    | 74               | 37.87       | Peak   |
|              | 3430            | 40.03                 | 31.05                 | 4.51            | 37.08                    | 38.51                    | 74               | 35.49       | Peak   |
|              | 5230            | 36.12                 | 33.71                 | 5.73            | 37.05                    | 38.51                    | 74               | 35.49       | Peak   |
|              | 7057            | 35.72                 | 35.59                 | 6.21            | 37.01                    | 40.51                    | 74               | 33.49       | Peak   |
|              | 8416            | 34.71                 | 38.36                 | 6.62            | 36.99                    | 42.7                     | 74               | 31.3        | Peak   |
|              | 9820            | 34.59                 | 38.4                  | 7.26            | 36.96                    | 43.29                    | 74               | 30.71       | Peak   |
| Vertical     | 1837            | 43.8                  | 26.83                 | 3.39            | 37.25                    | 36.77                    | 74               | 37.23       | Peak   |
|              | 3907            | 39.45                 | 32.33                 | 4.73            | 37.08                    | 39.43                    | 74               | 34.57       | Peak   |
|              | 5707            | 36.46                 | 34.2                  | 5.88            | 37.04                    | 39.5                     | 74               | 34.5        | Peak   |
|              | 7741            | 34.43                 | 37.2                  | 6.36            | 37                       | 40.99                    | 74               | 33.01       | Peak   |
|              | 8893            | 34.35                 | 38.34                 | 6.88            | 36.98                    | 42.59                    | 74               | 31.41       | Peak   |
|              | 9829            | 35.34                 | 38.4                  | 7.26            | 36.96                    | 44.04                    | 74               | 29.96       | Peak   |

**BT DH1: Hopping:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1657            | 43.77                 | 26.16                 | 3.19            | 37.4                     | 35.72                    | 74               | 38.28       | Peak   |
|              | 3376            | 40.13                 | 30.95                 | 4.49            | 37.09                    | 38.48                    | 74               | 35.52       | Peak   |
|              | 4906            | 36.42                 | 33.13                 | 5.6             | 37.06                    | 38.09                    | 74               | 35.91       | Peak   |
|              | 6283            | 34.87                 | 34.37                 | 6.02            | 37.03                    | 38.23                    | 74               | 35.77       | Peak   |
|              | 8128            | 34.26                 | 37.79                 | 6.49            | 36.99                    | 41.55                    | 74               | 32.45       | Peak   |
|              | 9649            | 33.74                 | 38.4                  | 7.2             | 36.97                    | 42.37                    | 74               | 31.63       | Peak   |
| Vertical     | 1603            | 44.21                 | 25.94                 | 3.14            | 37.45                    | 35.84                    | 74               | 38.16       | Peak   |
|              | 3430            | 40.11                 | 31.05                 | 4.51            | 37.08                    | 38.59                    | 74               | 35.41       | Peak   |
|              | 5275            | 36.21                 | 33.79                 | 5.76            | 37.05                    | 38.71                    | 74               | 35.29       | Peak   |
|              | 7147            | 35.08                 | 35.84                 | 6.24            | 37.01                    | 40.15                    | 74               | 33.85       | Peak   |
|              | 8605            | 33.92                 | 38.45                 | 6.69            | 36.98                    | 42.08                    | 74               | 31.92       | Peak   |
|              | 9775            | 35.65                 | 38.4                  | 7.26            | 36.96                    | 44.35                    | 74               | 29.65       | Peak   |

**BT DH3: CH39 (2441 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1801            | 44.08                 | 26.72                 | 3.33            | 37.28                    | 36.85                    | 74               | 37.15       | Peak   |
|              | 3610            | 39.44                 | 31.53                 | 4.59            | 37.08                    | 38.48                    | 74               | 35.52       | Peak   |
|              | 5545            | 36.43                 | 34.2                  | 5.83            | 37.04                    | 39.42                    | 74               | 34.58       | Peak   |
|              | 7237            | 34.6                  | 36.15                 | 6.26            | 37.01                    | 40                       | 74               | 34          | Peak   |
|              | 8920            | 34.34                 | 38.33                 | 6.88            | 36.98                    | 42.57                    | 74               | 31.43       | Peak   |
|              | 9883            | 34.54                 | 38.4                  | 7.33            | 36.96                    | 43.31                    | 74               | 30.69       | Peak   |
| Vertical     | 1756            | 43.72                 | 26.55                 | 3.31            | 37.32                    | 36.26                    | 74               | 37.74       | Peak   |
|              | 3916            | 38.51                 | 32.36                 | 4.75            | 37.08                    | 38.54                    | 74               | 35.46       | Peak   |
|              | 5500            | 36.93                 | 34.2                  | 5.8             | 37.05                    | 39.88                    | 74               | 34.12       | Peak   |
|              | 7273            | 34.63                 | 36.21                 | 6.26            | 37.01                    | 40.09                    | 74               | 33.91       | Peak   |
|              | 8785            | 34.44                 | 38.38                 | 6.81            | 36.98                    | 42.65                    | 74               | 31.35       | Peak   |
|              | 9955            | 34.49                 | 38.4                  | 7.33            | 36.96                    | 43.26                    | 74               | 30.74       | Peak   |

**BT DH3: Hopping:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1279            | 46.04                 | 24.79                 | 2.71            | 37.79                    | 35.75                    | 74               | 38.25       | Peak   |
|              | 3196            | 41.33                 | 30.56                 | 4.38            | 37.09                    | 39.18                    | 74               | 34.82       | Peak   |
|              | 4951            | 37.93                 | 33.2                  | 5.6             | 37.06                    | 39.67                    | 74               | 34.33       | Peak   |
|              | 6967            | 34.94                 | 35.36                 | 6.19            | 37.01                    | 39.48                    | 74               | 34.52       | Peak   |
|              | 8497            | 34.03                 | 38.5                  | 6.69            | 36.98                    | 42.24                    | 74               | 31.76       | Peak   |
|              | 9694            | 35.03                 | 38.4                  | 7.2             | 36.96                    | 43.67                    | 74               | 30.33       | Peak   |
| Vertical     | 1612            | 44.78                 | 25.98                 | 3.14            | 37.44                    | 36.46                    | 74               | 37.54       | Peak   |
|              | 3619            | 39.43                 | 31.56                 | 4.59            | 37.08                    | 38.5                     | 74               | 35.5        | Peak   |
|              | 5356            | 36.53                 | 33.95                 | 5.78            | 37.05                    | 39.21                    | 74               | 34.79       | Peak   |
|              | 7111            | 34.57                 | 35.78                 | 6.24            | 37.01                    | 39.58                    | 74               | 34.42       | Peak   |
|              | 8470            | 34.45                 | 38.45                 | 6.62            | 36.98                    | 42.54                    | 74               | 31.46       | Peak   |
|              | 9739            | 35.72                 | 38.4                  | 7.26            | 36.96                    | 44.42                    | 74               | 29.58       | Peak   |

**BT DH5: CH39 (2441 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1477            | 44.8                  | 25.44                 | 2.97            | 37.58                    | 35.63                    | 74               | 38.37       | Peak   |
|              | 3574            | 39.16                 | 31.44                 | 4.57            | 37.08                    | 38.09                    | 74               | 35.91       | Peak   |
|              | 5149            | 35.79                 | 33.57                 | 5.71            | 37.06                    | 38.01                    | 74               | 35.99       | Peak   |
|              | 7174            | 34.11                 | 35.96                 | 6.24            | 37.01                    | 39.3                     | 74               | 34.7        | Peak   |
|              | 8416            | 34.81                 | 38.36                 | 6.62            | 36.99                    | 42.8                     | 74               | 31.2        | Peak   |
|              | 9964            | 35.34                 | 38.4                  | 7.33            | 36.96                    | 44.11                    | 74               | 29.89       | Peak   |
| Vertical     | 1792            | 44.86                 | 26.68                 | 3.33            | 37.29                    | 37.58                    | 74               | 36.42       | Peak   |
|              | 3511            | 40.26                 | 31.26                 | 4.54            | 37.08                    | 38.98                    | 74               | 35.02       | Peak   |
|              | 4951            | 37.73                 | 33.2                  | 5.6             | 37.06                    | 39.47                    | 74               | 34.53       | Peak   |
|              | 7093            | 35.27                 | 35.71                 | 6.24            | 37.01                    | 40.21                    | 74               | 33.79       | Peak   |
|              | 8497            | 35.16                 | 38.5                  | 6.69            | 36.98                    | 43.37                    | 74               | 30.63       | Peak   |
|              | 9802            | 35                    | 38.4                  | 7.26            | 36.96                    | 43.7                     | 74               | 30.3        | Peak   |

**BT DH5: Hopping:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1513            | 45.47                 | 25.56                 | 3.02            | 37.54                    | 36.51                    | 74               | 37.49       | Peak   |
|              | 3421            | 40.39                 | 31.05                 | 4.51            | 37.08                    | 38.87                    | 74               | 35.13       | Peak   |
|              | 5077            | 36.6                  | 33.44                 | 5.68            | 37.06                    | 38.66                    | 74               | 35.34       | Peak   |
|              | 6598            | 34.32                 | 34.68                 | 6.12            | 37.02                    | 38.1                     | 74               | 35.9        | Peak   |
|              | 8380            | 34.5                  | 38.26                 | 6.62            | 36.99                    | 42.39                    | 74               | 31.61       | Peak   |
|              | 9784            | 34.25                 | 38.4                  | 7.26            | 36.96                    | 42.95                    | 74               | 31.05       | Peak   |
| Vertical     | 1423            | 45.35                 | 25.27                 | 2.91            | 37.63                    | 35.9                     | 74               | 38.1        | Peak   |
|              | 3187            | 40.29                 | 30.54                 | 4.38            | 37.09                    | 38.12                    | 74               | 35.88       | Peak   |
|              | 4798            | 37.53                 | 32.96                 | 5.48            | 37.06                    | 38.91                    | 74               | 35.09       | Peak   |
|              | 6553            | 35.01                 | 34.57                 | 6.09            | 37.02                    | 38.65                    | 74               | 35.35       | Peak   |
|              | 8452            | 33.91                 | 38.4                  | 6.62            | 36.98                    | 41.95                    | 74               | 32.05       | Peak   |
|              | 9802            | 35.16                 | 38.4                  | 7.26            | 36.96                    | 43.86                    | 74               | 30.14       | Peak   |

**BT 3DH1: CH39 (2441 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1522            | 45.34                 | 25.59                 | 3.02            | 37.53                    | 36.42                    | 74               | 37.58       | Peak   |
|              | 3187            | 40.11                 | 30.54                 | 4.38            | 37.09                    | 37.94                    | 74               | 36.06       | Peak   |
|              | 4897            | 36.74                 | 33.13                 | 5.6             | 37.06                    | 38.41                    | 74               | 35.59       | Peak   |
|              | 6697            | 34.22                 | 34.86                 | 6.14            | 37.02                    | 38.2                     | 74               | 35.8        | Peak   |
|              | 8407            | 34.91                 | 38.36                 | 6.62            | 36.99                    | 42.9                     | 74               | 31.1        | Peak   |
|              | 9667            | 35.13                 | 38.4                  | 7.2             | 36.97                    | 43.76                    | 74               | 30.24       | Peak   |
| Vertical     | 1567            | 44.55                 | 25.78                 | 3.08            | 37.49                    | 35.92                    | 74               | 38.08       | Peak   |
|              | 4042            | 37.6                  | 32.58                 | 4.84            | 37.07                    | 37.95                    | 74               | 36.05       | Peak   |
|              | 5599            | 35.72                 | 34.2                  | 5.85            | 37.04                    | 38.73                    | 74               | 35.27       | Peak   |
|              | 7291            | 33.96                 | 36.28                 | 6.26            | 37.01                    | 39.49                    | 74               | 34.51       | Peak   |
|              | 8668            | 34.41                 | 38.43                 | 6.75            | 36.98                    | 42.61                    | 74               | 31.39       | Peak   |
|              | 9685            | 35.33                 | 38.4                  | 7.2             | 36.96                    | 43.97                    | 74               | 30.03       | Peak   |

**BT 3DH1: Hopping:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1657            | 44.16                 | 26.16                 | 3.19            | 37.4                     | 36.11                    | 74               | 37.89       | Peak   |
|              | 3475            | 39.43                 | 31.16                 | 4.54            | 37.08                    | 38.05                    | 74               | 35.95       | Peak   |
|              | 5230            | 36.27                 | 33.71                 | 5.73            | 37.05                    | 38.66                    | 74               | 35.34       | Peak   |
|              | 7183            | 34.68                 | 35.96                 | 6.24            | 37.01                    | 39.87                    | 74               | 34.13       | Peak   |
|              | 8533            | 34.46                 | 38.48                 | 6.69            | 36.98                    | 42.65                    | 74               | 31.35       | Peak   |
|              | 9811            | 34.36                 | 38.4                  | 7.26            | 36.96                    | 43.06                    | 74               | 30.94       | Peak   |
| Vertical     | 1468            | 45.48                 | 25.41                 | 2.97            | 37.59                    | 36.27                    | 74               | 37.73       | Peak   |
|              | 3331            | 40.3                  | 30.85                 | 4.46            | 37.09                    | 38.52                    | 74               | 35.48       | Peak   |
|              | 4942            | 37.03                 | 33.2                  | 5.6             | 37.06                    | 38.77                    | 74               | 35.23       | Peak   |
|              | 6823            | 34.54                 | 35.08                 | 6.17            | 37.02                    | 38.77                    | 74               | 35.23       | Peak   |
|              | 8650            | 34.01                 | 38.44                 | 6.75            | 36.98                    | 42.22                    | 74               | 31.78       | Peak   |
|              | 9910            | 35.69                 | 38.4                  | 7.33            | 36.96                    | 44.46                    | 74               | 29.54       | Peak   |

**BT 3DH3: CH39 (2441 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1792            | 44.38                 | 26.68                 | 3.33            | 37.29                    | 37.1                     | 74               | 36.9        | Peak   |
|              | 3853            | 37.76                 | 32.21                 | 4.73            | 37.08                    | 37.62                    | 74               | 36.38       | Peak   |
|              | 5149            | 36.49                 | 33.57                 | 5.71            | 37.06                    | 38.71                    | 74               | 35.29       | Peak   |
|              | 7129            | 34.61                 | 35.84                 | 6.24            | 37.01                    | 39.68                    | 74               | 34.32       | Peak   |
|              | 8983            | 35.2                  | 38.3                  | 6.88            | 36.98                    | 43.4                     | 74               | 30.6        | Peak   |
|              | 9775            | 35.03                 | 38.4                  | 7.26            | 36.96                    | 43.73                    | 74               | 30.27       | Peak   |
| Vertical     | 1702            | 44.47                 | 26.34                 | 3.25            | 37.37                    | 36.69                    | 74               | 37.31       | Peak   |
|              | 3844            | 39.26                 | 32.18                 | 4.7             | 37.08                    | 39.06                    | 74               | 34.94       | Peak   |
|              | 5545            | 36.67                 | 34.2                  | 5.83            | 37.04                    | 39.66                    | 74               | 34.34       | Peak   |
|              | 7228            | 34.7                  | 36.09                 | 6.26            | 37.01                    | 40.04                    | 74               | 33.96       | Peak   |
|              | 8488            | 34.79                 | 38.5                  | 6.69            | 36.98                    | 43                       | 74               | 31          | Peak   |
|              | 9793            | 35.22                 | 38.4                  | 7.26            | 36.96                    | 43.92                    | 74               | 30.08       | Peak   |

**BT 3DH3: Hopping:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1531            | 44.5                  | 25.63                 | 3.05            | 37.52                    | 35.66                    | 74               | 38.34       | Peak   |
|              | 3808            | 38.22                 | 32.09                 | 4.7             | 37.08                    | 37.93                    | 74               | 36.07       | Peak   |
|              | 5374            | 35.8                  | 33.98                 | 5.78            | 37.05                    | 38.51                    | 74               | 35.49       | Peak   |
|              | 7174            | 34.74                 | 35.96                 | 6.24            | 37.01                    | 39.93                    | 74               | 34.07       | Peak   |
|              | 8803            | 34.2                  | 38.37                 | 6.81            | 36.98                    | 42.4                     | 74               | 31.6        | Peak   |
|              | 9766            | 34.5                  | 38.4                  | 7.26            | 36.96                    | 43.2                     | 74               | 30.8        | Peak   |
| Vertical     | 1468            | 45.45                 | 25.41                 | 2.97            | 37.59                    | 36.24                    | 74               | 37.76       | Peak   |
|              | 3376            | 40.24                 | 30.95                 | 4.49            | 37.09                    | 38.59                    | 74               | 35.41       | Peak   |
|              | 4996            | 36.58                 | 33.3                  | 5.66            | 37.06                    | 38.48                    | 74               | 35.52       | Peak   |
|              | 6850            | 35.15                 | 35.15                 | 6.17            | 37.01                    | 39.46                    | 74               | 34.54       | Peak   |
|              | 8434            | 34.85                 | 38.4                  | 6.62            | 36.98                    | 42.89                    | 74               | 31.11       | Peak   |
|              | 9874            | 34.59                 | 38.4                  | 7.33            | 36.96                    | 43.36                    | 74               | 30.64       | Peak   |

**BT 3DH5: CH39 (2441 MHz):**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1324            | 45.86                 | 24.95                 | 2.77            | 37.74                    | 35.84                    | 74               | 38.16       | Peak   |
|              | 3475            | 39.77                 | 31.16                 | 4.54            | 37.08                    | 38.39                    | 74               | 35.61       | Peak   |
|              | 5077            | 36.82                 | 33.44                 | 5.68            | 37.06                    | 38.88                    | 74               | 35.12       | Peak   |
|              | 6796            | 34.12                 | 35.04                 | 6.17            | 37.02                    | 38.31                    | 74               | 35.69       | Peak   |
|              | 8407            | 34.58                 | 38.36                 | 6.62            | 36.99                    | 42.57                    | 74               | 31.43       | Peak   |
|              | 9784            | 35.28                 | 38.4                  | 7.26            | 36.96                    | 43.98                    | 74               | 30.02       | Peak   |
| Vertical     | 1657            | 44.08                 | 26.16                 | 3.19            | 37.4                     | 36.03                    | 74               | 37.97       | Peak   |
|              | 3763            | 38.76                 | 31.94                 | 4.67            | 37.08                    | 38.29                    | 74               | 35.71       | Peak   |
|              | 5572            | 36.33                 | 34.2                  | 5.83            | 37.04                    | 39.32                    | 74               | 34.68       | Peak   |
|              | 7597            | 35.01                 | 37.04                 | 6.33            | 37                       | 41.38                    | 74               | 32.62       | Peak   |
|              | 8866            | 34.96                 | 38.35                 | 6.81            | 36.98                    | 43.14                    | 74               | 30.86       | Peak   |
|              | 9883            | 35.63                 | 38.4                  | 7.33            | 36.96                    | 44.4                     | 74               | 29.6        | Peak   |

**BT 3DH5: Hopping:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 1567            | 44.62                 | 25.78                 | 3.08            | 37.49                    | 35.99                    | 74               | 38.01       | Peak   |
|              | 3610            | 39.29                 | 31.53                 | 4.59            | 37.08                    | 38.33                    | 74               | 35.67       | Peak   |
|              | 5185            | 36.22                 | 33.63                 | 5.71            | 37.05                    | 38.51                    | 74               | 35.49       | Peak   |
|              | 7282            | 34.42                 | 36.28                 | 6.26            | 37.01                    | 39.95                    | 74               | 34.05       | Peak   |
|              | 9010            | 34.53                 | 38.31                 | 6.94            | 36.98                    | 42.8                     | 74               | 31.2        | Peak   |
|              | 9919            | 33.24                 | 38.4                  | 7.33            | 36.96                    | 42.01                    | 74               | 31.99       | Peak   |
| Vertical     | 1711            | 43.8                  | 26.37                 | 3.25            | 37.36                    | 36.06                    | 74               | 37.94       | Peak   |
|              | 3520            | 40.61                 | 31.26                 | 4.54            | 37.08                    | 39.33                    | 74               | 34.67       | Peak   |
|              | 5140            | 36.44                 | 33.55                 | 5.71            | 37.06                    | 38.64                    | 74               | 35.36       | Peak   |
|              | 7615            | 34.14                 | 37.04                 | 6.33            | 37                       | 40.51                    | 74               | 33.49       | Peak   |
|              | 8947            | 34.65                 | 38.32                 | 6.88            | 36.98                    | 42.87                    | 74               | 31.13       | Peak   |
|              | 9883            | 34.05                 | 38.4                  | 7.33            | 36.96                    | 42.82                    | 74               | 31.18       | Peak   |

TEST ENGINEER: Jarey

**Emissions in restricted frequency bands:**

|           |   |                        |                |            |
|-----------|---|------------------------|----------------|------------|
| EUT       | : | SMART CARD<br>TERMINAL | Temperature :  | 22°C       |
| Model No. | : | WB-20                  | Humidity :     | 51%RH      |
| Test Mode | : | Transmitting           | Date of Test : | 2021.01.28 |

**BT DH1:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2334.9          | 46.42                 | 28.16                 | 3.83            | 37.11                    | 41.3                     | 74               | 32.7        | Peak    |
|              | 2334.9          | 32.94                 | 28.16                 | 3.83            | 37.11                    | 27.82                    | 54               | 26.18       | Average |
|              | 2357.3          | 44.57                 | 28.21                 | 3.85            | 37.11                    | 39.52                    | 74               | 34.48       | Peak    |
|              | 2357.3          | 33.26                 | 28.21                 | 3.85            | 37.11                    | 28.21                    | 54               | 25.79       | Average |
|              | 2389.8          | 54.71                 | 28.27                 | 3.85            | 37.11                    | 49.72                    | 74               | 24.28       | Peak    |
|              | 2389.8          | 38.67                 | 28.27                 | 3.85            | 37.11                    | 33.68                    | 54               | 20.32       | Average |
|              | 2484.1          | 47.24                 | 28.47                 | 3.93            | 37.11                    | 42.53                    | 74               | 31.47       | Peak    |
|              | 2484.1          | 35.13                 | 28.47                 | 3.93            | 37.11                    | 30.42                    | 54               | 23.58       | Average |
|              | 2490.1          | 45.49                 | 28.49                 | 3.93            | 37.11                    | 40.8                     | 74               | 33.2        | Peak    |
|              | 2490.1          | 32.35                 | 28.49                 | 3.93            | 37.11                    | 27.66                    | 54               | 26.34       | Average |
|              | 2496.79         | 46.68                 | 28.5                  | 3.93            | 37.11                    | 42                       | 74               | 32          | Peak    |
|              | 2496.79         | 32.47                 | 28.5                  | 3.93            | 37.11                    | 27.79                    | 54               | 26.21       | Average |
| Vertical     | 2336            | 45.23                 | 28.17                 | 3.83            | 37.11                    | 40.12                    | 74               | 33.88       | Peak    |
|              | 2336            | 33.42                 | 28.17                 | 3.83            | 37.11                    | 28.31                    | 54               | 25.69       | Average |
|              | 2359.4          | 45.12                 | 28.21                 | 3.85            | 37.11                    | 40.07                    | 74               | 33.93       | Peak    |
|              | 2359.4          | 34.42                 | 28.21                 | 3.85            | 37.11                    | 29.37                    | 54               | 24.63       | Average |
|              | 2389            | 62.27                 | 28.27                 | 3.85            | 37.11                    | 57.28                    | 74               | 16.72       | Peak    |
|              | 2389            | 41.93                 | 28.27                 | 3.85            | 37.11                    | 36.94                    | 54               | 17.06       | Average |
|              | 2484.1          | 45.81                 | 28.47                 | 3.93            | 37.11                    | 41.1                     | 74               | 32.9        | Peak    |
|              | 2484.1          | 33.49                 | 28.47                 | 3.93            | 37.11                    | 28.78                    | 54               | 25.22       | Average |
|              | 2490.01         | 45.48                 | 28.49                 | 3.93            | 37.11                    | 40.79                    | 74               | 33.21       | Peak    |
|              | 2490.01         | 32.65                 | 28.49                 | 3.93            | 37.11                    | 27.96                    | 54               | 26.04       | Average |
|              | 2496.28         | 45.95                 | 28.49                 | 3.93            | 37.11                    | 41.26                    | 74               | 32.74       | Peak    |
|              | 2496.28         | 33.6                  | 28.49                 | 3.93            | 37.11                    | 28.91                    | 54               | 25.09       | Average |

**BT DH3:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2327.2          | 44.51                 | 28.14                 | 3.83            | 37.11                    | 39.37                    | 74               | 34.63       | Peak    |
|              | 2327.2          | 33.15                 | 28.14                 | 3.83            | 37.11                    | 28.01                    | 54               | 25.99       | Average |
|              | 2359            | 46.25                 | 28.21                 | 3.85            | 37.11                    | 41.2                     | 74               | 32.8        | Peak    |
|              | 2359            | 32.68                 | 28.21                 | 3.85            | 37.11                    | 27.63                    | 54               | 26.37       | Average |
|              | 2389.4          | 56.85                 | 28.27                 | 3.85            | 37.11                    | 51.86                    | 74               | 22.14       | Peak    |
|              | 2389.4          | 37.19                 | 28.27                 | 3.85            | 37.11                    | 32.2                     | 54               | 21.8        | Average |
|              | 2483.98         | 46.82                 | 28.47                 | 3.93            | 37.11                    | 42.11                    | 74               | 31.89       | Peak    |
|              | 2483.98         | 34.79                 | 28.47                 | 3.93            | 37.11                    | 30.08                    | 54               | 23.92       | Average |
|              | 2490.52         | 45.04                 | 28.49                 | 3.93            | 37.11                    | 40.35                    | 74               | 33.65       | Peak    |
|              | 2490.52         | 32.31                 | 28.49                 | 3.93            | 37.11                    | 27.62                    | 54               | 26.38       | Average |
|              | 2497.21         | 45.59                 | 28.5                  | 3.93            | 37.11                    | 40.91                    | 74               | 33.09       | Peak    |
|              | 2497.21         | 32.16                 | 28.5                  | 3.93            | 37.11                    | 27.48                    | 54               | 26.52       | Average |
| Vertical     | 2340.7          | 45.66                 | 28.17                 | 3.83            | 37.11                    | 40.55                    | 74               | 33.45       | Peak    |
|              | 2340.7          | 33.46                 | 28.17                 | 3.83            | 37.11                    | 28.35                    | 54               | 25.65       | Average |
|              | 2368            | 47.66                 | 28.23                 | 3.85            | 37.11                    | 42.63                    | 74               | 31.37       | Peak    |
|              | 2368            | 34.27                 | 28.23                 | 3.85            | 37.11                    | 29.24                    | 54               | 24.76       | Average |
|              | 2389.6          | 61.04                 | 28.27                 | 3.85            | 37.11                    | 56.05                    | 74               | 17.95       | Peak    |
|              | 2389.6          | 41.31                 | 28.27                 | 3.85            | 37.11                    | 36.32                    | 54               | 17.68       | Average |
|              | 2483.89         | 45.81                 | 28.47                 | 3.93            | 37.11                    | 41.1                     | 74               | 32.9        | Peak    |
|              | 2483.89         | 33.49                 | 28.47                 | 3.93            | 37.11                    | 28.78                    | 54               | 25.22       | Average |
|              | 2490.4          | 45.71                 | 28.49                 | 3.93            | 37.11                    | 41.02                    | 74               | 32.98       | Peak    |
|              | 2490.4          | 33.27                 | 28.49                 | 3.93            | 37.11                    | 28.58                    | 54               | 25.42       | Average |
|              | 2496.34         | 46.84                 | 28.5                  | 3.93            | 37.11                    | 42.16                    | 74               | 31.84       | Peak    |
|              | 2496.34         | 33.19                 | 28.5                  | 3.93            | 37.11                    | 28.51                    | 54               | 25.49       | Average |

**BT DH5:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2327.2          | 44.48                 | 28.14                 | 3.83            | 37.11                    | 39.34                    | 74               | 34.66       | Peak    |
|              | 2327.2          | 33.25                 | 28.14                 | 3.83            | 37.11                    | 28.11                    | 54               | 25.89       | Average |
|              | 2362            | 44.7                  | 28.21                 | 3.85            | 37.11                    | 39.65                    | 74               | 34.35       | Peak    |
|              | 2362            | 33.84                 | 28.21                 | 3.85            | 37.11                    | 28.79                    | 54               | 25.21       | Average |
|              | 2389.8          | 55.12                 | 28.27                 | 3.85            | 37.11                    | 50.13                    | 74               | 23.87       | Peak    |
|              | 2389.8          | 38.45                 | 28.27                 | 3.85            | 37.11                    | 33.46                    | 54               | 20.54       | Average |
|              | 2483.83         | 45.61                 | 28.47                 | 3.93            | 37.11                    | 40.9                     | 74               | 33.1        | Peak    |
|              | 2483.83         | 36.27                 | 28.47                 | 3.93            | 37.11                    | 31.56                    | 54               | 22.44       | Average |
|              | 2491.39         | 44.75                 | 28.49                 | 3.93            | 37.11                    | 40.06                    | 74               | 33.94       | Peak    |
|              | 2491.39         | 32.58                 | 28.49                 | 3.93            | 37.11                    | 27.89                    | 54               | 26.11       | Average |
|              | 2498.35         | 44.89                 | 28.5                  | 3.93            | 37.11                    | 40.21                    | 74               | 33.79       | Peak    |
|              | 2498.35         | 32.19                 | 28.5                  | 3.93            | 37.11                    | 27.51                    | 54               | 26.49       | Average |
| Vertical     | 2331.4          | 46.42                 | 28.16                 | 3.83            | 37.11                    | 41.3                     | 74               | 32.7        | Peak    |
|              | 2331.4          | 33.14                 | 28.16                 | 3.83            | 37.11                    | 28.02                    | 54               | 25.98       | Average |
|              | 2366.2          | 48.71                 | 28.23                 | 3.85            | 37.11                    | 43.68                    | 74               | 30.32       | Peak    |
|              | 2366.2          | 33.57                 | 28.23                 | 3.85            | 37.11                    | 28.54                    | 54               | 25.46       | Average |
|              | 2389.9          | 60.34                 | 28.27                 | 3.85            | 37.11                    | 55.35                    | 74               | 18.65       | Peak    |
|              | 2389.9          | 42.24                 | 28.27                 | 3.85            | 37.11                    | 37.25                    | 54               | 16.75       | Average |
|              | 2484.25         | 44.94                 | 28.47                 | 3.93            | 37.11                    | 40.23                    | 74               | 33.77       | Peak    |
|              | 2484.25         | 33.6                  | 28.47                 | 3.93            | 37.11                    | 28.89                    | 54               | 25.11       | Average |
|              | 2490.79         | 45.42                 | 28.49                 | 3.93            | 37.11                    | 40.73                    | 74               | 33.27       | Peak    |
|              | 2490.79         | 33.14                 | 28.49                 | 3.93            | 37.11                    | 28.45                    | 54               | 25.55       | Average |
|              | 2495.65         | 44.91                 | 28.49                 | 3.93            | 37.11                    | 40.22                    | 74               | 33.78       | Peak    |
|              | 2495.65         | 33.39                 | 28.49                 | 3.93            | 37.11                    | 28.7                     | 54               | 25.3        | Average |

**BT 3DH1:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2327.1          | 44.61                 | 28.14                 | 3.83            | 37.11                    | 39.47                    | 74               | 34.53       | Peak    |
|              | 2327.1          | 32.16                 | 28.14                 | 3.83            | 37.11                    | 27.02                    | 54               | 26.98       | Average |
|              | 2351.7          | 44.51                 | 28.2                  | 3.83            | 37.11                    | 39.43                    | 74               | 34.57       | Peak    |
|              | 2351.7          | 33.25                 | 28.2                  | 3.83            | 37.11                    | 28.17                    | 54               | 25.83       | Average |
|              | 2389.4          | 55.35                 | 28.27                 | 3.85            | 37.11                    | 50.36                    | 74               | 23.64       | Peak    |
|              | 2389.4          | 37.54                 | 28.27                 | 3.85            | 37.11                    | 32.55                    | 54               | 21.45       | Average |
|              | 2483.92         | 46.79                 | 28.47                 | 3.93            | 37.11                    | 42.08                    | 74               | 31.92       | Peak    |
|              | 2483.92         | 34.59                 | 28.47                 | 3.93            | 37.11                    | 29.88                    | 54               | 24.12       | Average |
|              | 2491.48         | 44.31                 | 28.49                 | 3.93            | 37.11                    | 39.62                    | 74               | 34.38       | Peak    |
|              | 2491.48         | 32.23                 | 28.49                 | 3.93            | 37.11                    | 27.54                    | 54               | 26.46       | Average |
|              | 2498.14         | 44.12                 | 28.5                  | 3.93            | 37.11                    | 39.44                    | 74               | 34.56       | Peak    |
|              | 2498.14         | 33.62                 | 28.5                  | 3.93            | 37.11                    | 28.94                    | 54               | 25.06       | Average |
| Vertical     | 2334.8          | 45.53                 | 28.16                 | 3.83            | 37.11                    | 40.41                    | 74               | 33.59       | Peak    |
|              | 2334.8          | 33.15                 | 28.16                 | 3.83            | 37.11                    | 28.03                    | 54               | 25.97       | Average |
|              | 2359.3          | 44.72                 | 28.21                 | 3.85            | 37.11                    | 39.67                    | 74               | 34.33       | Peak    |
|              | 2359.3          | 33.38                 | 28.21                 | 3.85            | 37.11                    | 28.33                    | 54               | 25.67       | Average |
|              | 2389.8          | 57.15                 | 28.27                 | 3.85            | 37.11                    | 52.16                    | 74               | 21.84       | Peak    |
|              | 2389.8          | 39.52                 | 28.27                 | 3.85            | 37.11                    | 34.53                    | 54               | 19.47       | Average |
|              | 2484.1          | 49.28                 | 28.47                 | 3.93            | 37.11                    | 44.57                    | 74               | 29.43       | Peak    |
|              | 2484.1          | 35.33                 | 28.47                 | 3.93            | 37.11                    | 30.62                    | 54               | 23.38       | Average |
|              | 2488.12         | 52.43                 | 28.47                 | 3.93            | 37.11                    | 47.72                    | 74               | 26.28       | Peak    |
|              | 2488.12         | 34.15                 | 28.47                 | 3.93            | 37.11                    | 29.44                    | 54               | 24.56       | Average |
|              | 2494.45         | 44.86                 | 28.49                 | 3.93            | 37.11                    | 40.17                    | 74               | 33.83       | Peak    |
|              | 2494.45         | 34.49                 | 28.49                 | 3.93            | 37.11                    | 29.8                     | 54               | 24.2        | Average |

**BT 3DH3:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2335.3          | 46.61                 | 28.16                 | 3.83            | 37.11                    | 41.49                    | 74               | 32.51       | Peak    |
|              | 2335.3          | 34.25                 | 28.16                 | 3.83            | 37.11                    | 29.13                    | 54               | 24.87       | Average |
|              | 2360.5          | 45.2                  | 28.21                 | 3.85            | 37.11                    | 40.15                    | 74               | 33.85       | Peak    |
|              | 2360.5          | 34.33                 | 28.21                 | 3.85            | 37.11                    | 29.28                    | 54               | 24.72       | Average |
|              | 2388.6          | 53.98                 | 28.27                 | 3.85            | 37.11                    | 48.99                    | 74               | 25.01       | Peak    |
|              | 2388.6          | 36.5                  | 28.27                 | 3.85            | 37.11                    | 31.51                    | 54               | 22.49       | Average |
|              | 2484.82         | 43.93                 | 28.47                 | 3.93            | 37.11                    | 39.22                    | 74               | 34.78       | Peak    |
|              | 2484.82         | 33.3                  | 28.47                 | 3.93            | 37.11                    | 28.59                    | 54               | 25.41       | Average |
|              | 2490.37         | 43.39                 | 28.49                 | 3.93            | 37.11                    | 38.7                     | 74               | 35.3        | Peak    |
|              | 2490.37         | 32.64                 | 28.49                 | 3.93            | 37.11                    | 27.95                    | 54               | 26.05       | Average |
|              | 2495.65         | 44.5                  | 28.49                 | 3.93            | 37.11                    | 39.81                    | 74               | 34.19       | Peak    |
|              | 2495.65         | 32.25                 | 28.49                 | 3.93            | 37.11                    | 27.56                    | 54               | 26.44       | Average |
| Vertical     | 2334.9          | 44.93                 | 28.16                 | 3.83            | 37.11                    | 39.81                    | 74               | 34.19       | Peak    |
|              | 2334.9          | 33.19                 | 28.16                 | 3.83            | 37.11                    | 28.07                    | 54               | 25.93       | Average |
|              | 2357.9          | 44.86                 | 28.21                 | 3.85            | 37.11                    | 39.81                    | 74               | 34.19       | Peak    |
|              | 2357.9          | 33.29                 | 28.21                 | 3.85            | 37.11                    | 28.24                    | 54               | 25.76       | Average |
|              | 2389            | 60.56                 | 28.27                 | 3.85            | 37.11                    | 55.57                    | 74               | 18.43       | Peak    |
|              | 2389            | 39.36                 | 28.27                 | 3.85            | 37.11                    | 34.37                    | 54               | 19.63       | Average |
|              | 2483.95         | 45.21                 | 28.47                 | 3.93            | 37.11                    | 40.5                     | 74               | 33.5        | Peak    |
|              | 2483.95         | 33.63                 | 28.47                 | 3.93            | 37.11                    | 28.92                    | 54               | 25.08       | Average |
|              | 2487.49         | 46.28                 | 28.47                 | 3.93            | 37.11                    | 41.57                    | 74               | 32.43       | Peak    |
|              | 2487.49         | 35.53                 | 28.47                 | 3.93            | 37.11                    | 30.82                    | 54               | 23.18       | Average |
|              | 2496.28         | 47.97                 | 28.49                 | 3.93            | 37.11                    | 43.28                    | 74               | 30.72       | Peak    |
|              | 2496.28         | 33.5                  | 28.49                 | 3.93            | 37.11                    | 28.81                    | 54               | 25.19       | Average |

**BT 3DH5:**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2332.2          | 45.58                 | 28.16                 | 3.83            | 37.11                    | 40.46                    | 74               | 33.54       | Peak    |
|              | 2332.2          | 33.35                 | 28.16                 | 3.83            | 37.11                    | 28.23                    | 54               | 25.77       | Average |
|              | 2353.8          | 44.23                 | 28.2                  | 3.83            | 37.11                    | 39.15                    | 74               | 34.85       | Peak    |
|              | 2353.8          | 33.42                 | 28.2                  | 3.83            | 37.11                    | 28.34                    | 54               | 25.66       | Average |
|              | 2388.5          | 57.24                 | 28.27                 | 3.85            | 37.11                    | 52.25                    | 74               | 21.75       | Peak    |
|              | 2388.5          | 35.63                 | 28.27                 | 3.85            | 37.11                    | 30.64                    | 54               | 23.36       | Average |
|              | 2484.16         | 46.05                 | 28.47                 | 3.93            | 37.11                    | 41.34                    | 74               | 32.66       | Peak    |
|              | 2484.16         | 34.11                 | 28.47                 | 3.93            | 37.11                    | 29.4                     | 54               | 24.6        | Average |
|              | 2490.04         | 46.65                 | 28.49                 | 3.93            | 37.11                    | 41.96                    | 74               | 32.04       | Peak    |
|              | 2490.04         | 32.47                 | 28.49                 | 3.93            | 37.11                    | 27.78                    | 54               | 26.22       | Average |
|              | 2495.11         | 45.02                 | 28.49                 | 3.93            | 37.11                    | 40.33                    | 74               | 33.67       | Peak    |
|              | 2495.11         | 32.45                 | 28.49                 | 3.93            | 37.11                    | 27.76                    | 54               | 26.24       | Average |
| Vertical     | 2339.6          | 46.8                  | 28.17                 | 3.83            | 37.11                    | 41.69                    | 74               | 32.31       | Peak    |
|              | 2339.6          | 33.48                 | 28.17                 | 3.83            | 37.11                    | 28.37                    | 54               | 25.63       | Average |
|              | 2364.9          | 44.96                 | 28.23                 | 3.85            | 37.11                    | 39.93                    | 74               | 34.07       | Peak    |
|              | 2364.9          | 33.33                 | 28.23                 | 3.85            | 37.11                    | 28.3                     | 54               | 25.7        | Average |
|              | 2389.6          | 61.47                 | 28.27                 | 3.85            | 37.11                    | 56.48                    | 74               | 17.52       | Peak    |
|              | 2389.6          | 39.63                 | 28.27                 | 3.85            | 37.11                    | 34.64                    | 54               | 19.36       | Average |
|              | 2484.4          | 45.34                 | 28.47                 | 3.93            | 37.11                    | 40.63                    | 74               | 33.37       | Peak    |
|              | 2484.4          | 36.14                 | 28.47                 | 3.93            | 37.11                    | 31.43                    | 54               | 22.57       | Average |
|              | 2491.06         | 46.1                  | 28.49                 | 3.93            | 37.11                    | 41.41                    | 74               | 32.59       | Peak    |
|              | 2491.06         | 32.41                 | 28.49                 | 3.93            | 37.11                    | 27.72                    | 54               | 26.28       | Average |
|              | 2495.74         | 47.26                 | 28.49                 | 3.93            | 37.11                    | 42.57                    | 74               | 31.43       | Peak    |
|              | 2495.74         | 33.63                 | 28.49                 | 3.93            | 37.11                    | 28.94                    | 54               | 25.06       | Average |

TEST ENGINEER: Jarey

## 5 20 DB BANDWIDTH MEASUREMENT

### 5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

| Item | Type              | Manufacturer  | Model No.       | Serial No.     | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A          | MY52221182     | 2020.09.16 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F LEX | F02-150819-045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+       | 001            | 2020.08.06 | 1 Year        |

### 5.2 Block Diagram of Test Setup



### 5.3 Specification Limits (§15.247(a)(1))

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### 5.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

### 5.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

Use the following spectrum analyzer settings:

- Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
- RBW  $\geq$  1% of the 20 dB bandwidth
- VBW  $\geq$  RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold

The 20 dB bandwidth is defined as the total spectrum the power of which is lower than peak power minus 20 dB .

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure “ 20 dB Bandwidth” was used).

## 5.6 Test Results

### **PASSED.**

All the test results are attached in next pages.

(Test Date: 2020.11.18 Temperature: 23°C Humidity: 51 %)

| Modulation | Channel | Frequency (MHz) | 20dB Bandwidth (MHz) | 2/3 20dB Bandwidth (MHz) |
|------------|---------|-----------------|----------------------|--------------------------|
| BT DH1     | 00      | 2402            | <b>937.6</b>         | <b>625.1</b>             |
|            | 39      | 2441            | <b>938.4</b>         | <b>625.6</b>             |
|            | 78      | 2480            | <b>831.3</b>         | <b>554.2</b>             |
| BT DH3     | 00      | 2402            | <b>934.3</b>         | <b>622.9</b>             |
|            | 39      | 2441            | <b>870.6</b>         | <b>580.4</b>             |
|            | 78      | 2480            | <b>872.4</b>         | <b>581.6</b>             |
| BT DH5     | 00      | 2402            | <b>818.1</b>         | <b>545.4</b>             |
|            | 39      | 2441            | <b>818.5</b>         | <b>545.7</b>             |
|            | 78      | 2480            | <b>817.9</b>         | <b>545.3</b>             |
| BT 3DH1    | 00      | 2402            | <b>1159</b>          | <b>772.7</b>             |
|            | 39      | 2441            | <b>1158</b>          | <b>772.0</b>             |
|            | 78      | 2480            | <b>1160</b>          | <b>773.3</b>             |
| BT 3DH3    | 00      | 2402            | <b>1123</b>          | <b>748.7</b>             |
|            | 39      | 2441            | <b>1122</b>          | <b>748.0</b>             |
|            | 78      | 2480            | <b>1125</b>          | <b>750.0</b>             |
| BT 3DH5    | 00      | 2402            | <b>1110</b>          | <b>740.0</b>             |
|            | 39      | 2441            | <b>1110</b>          | <b>740.0</b>             |
|            | 78      | 2480            | <b>1110</b>          | <b>740.0</b>             |

BT DH1: CH00 (2402 MHz)



BT DH1: CH39 (2441 MHz)



BT DH1: CH78 (2480 MHz)



BT DH3: CH00 (2402 MHz)



BT DH3: CH39 (2441 MHz)



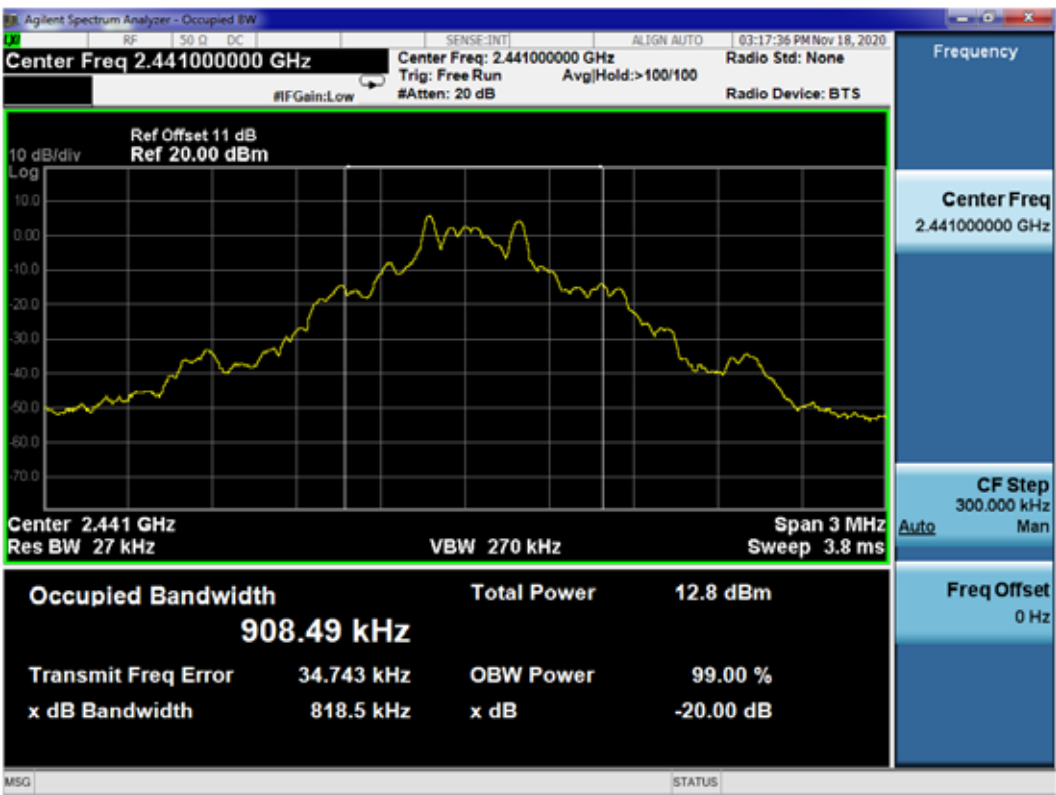
BT DH3: CH78 (2480 MHz)



BT DH5: CH00 (2402 MHz)



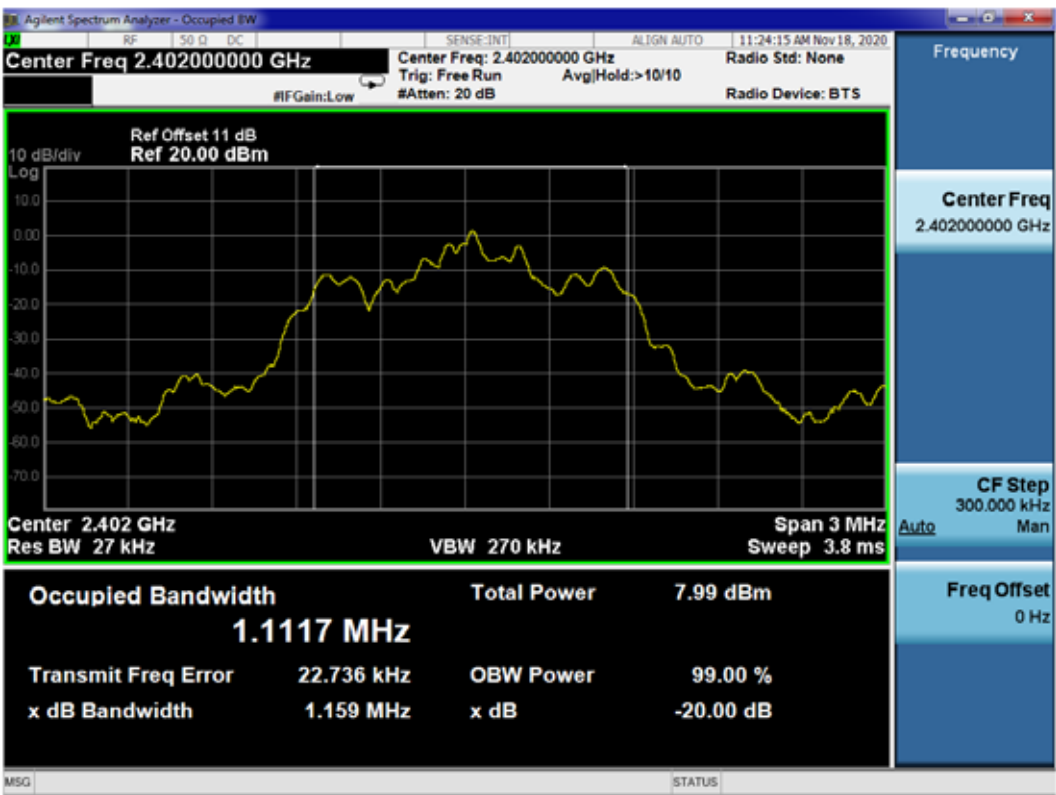
BT DH5: CH39 (2441 MHz)



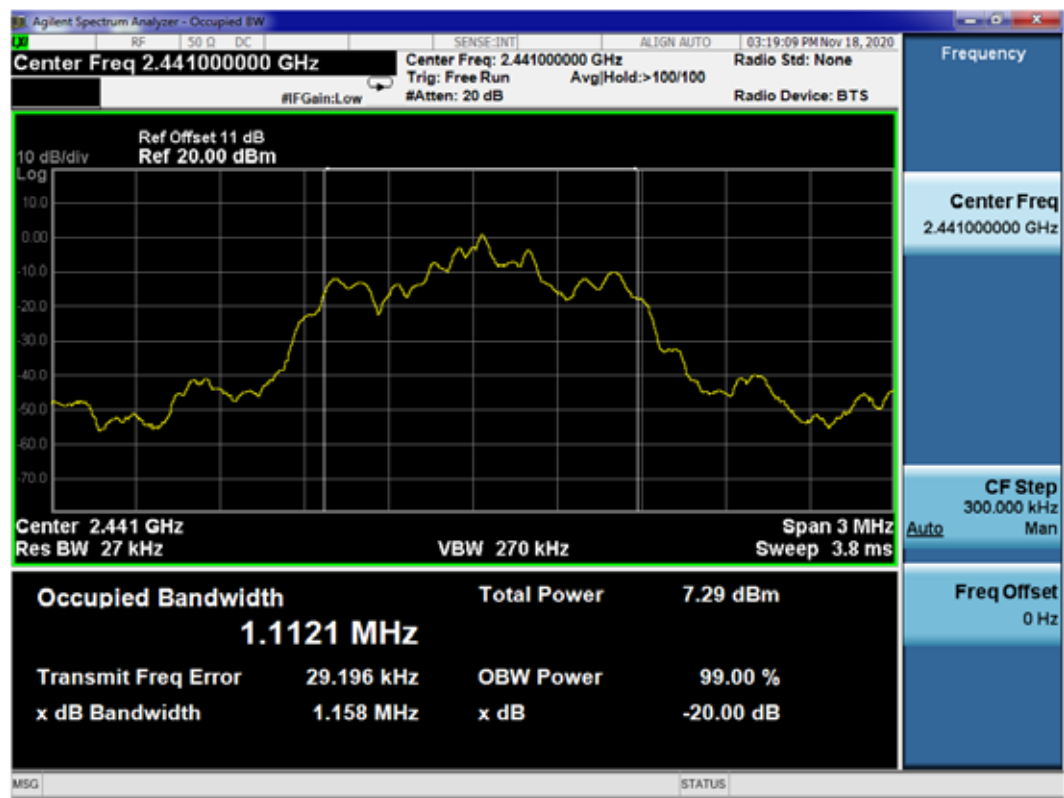
BT DH5: CH78 (2480 MHz)



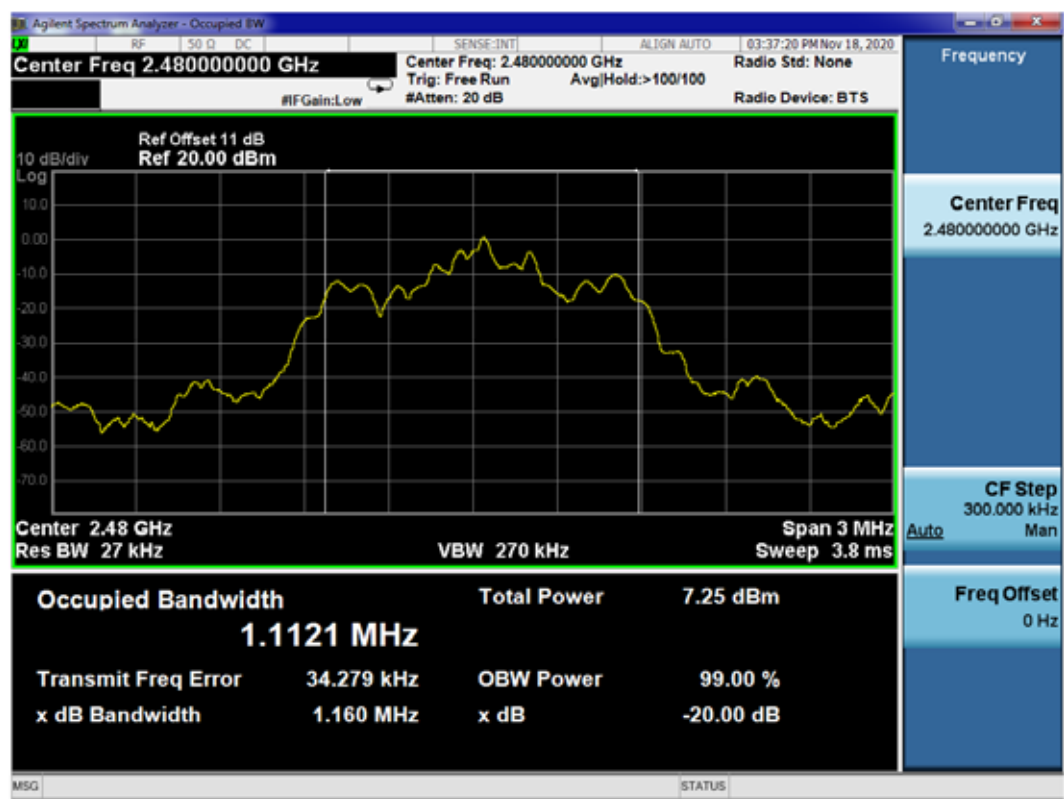
BT 3DH1: CH00 (2402 MHz)



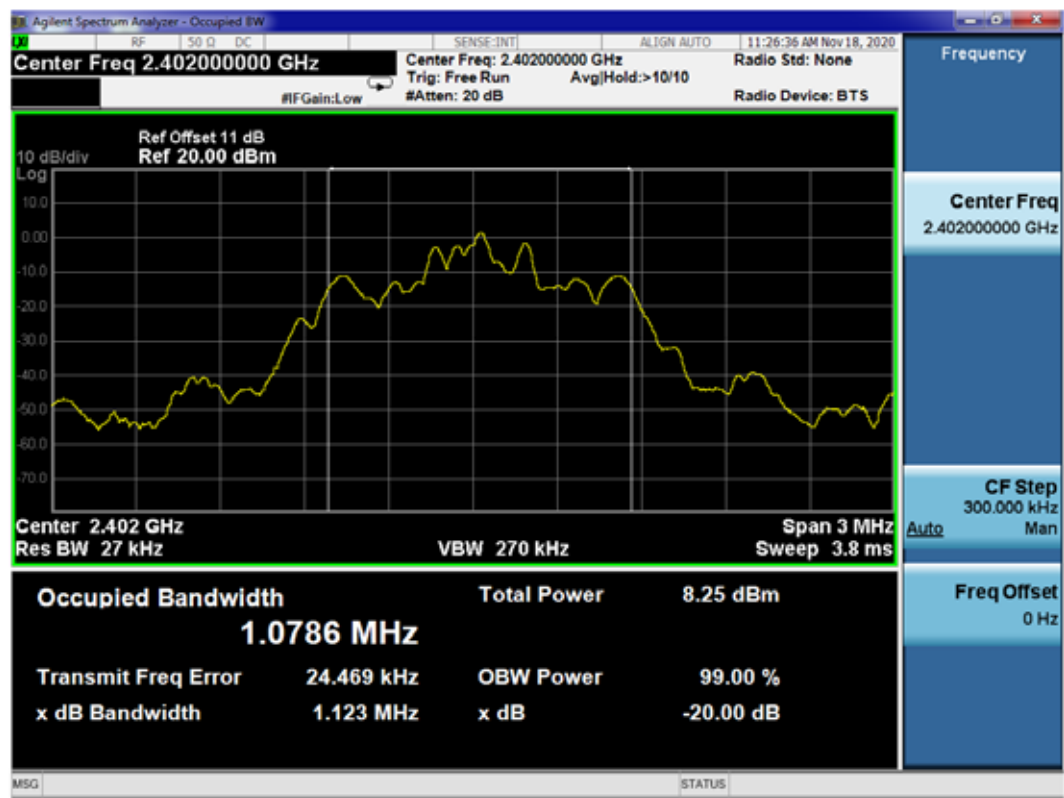
BT 3DH1: CH39 (2441 MHz)



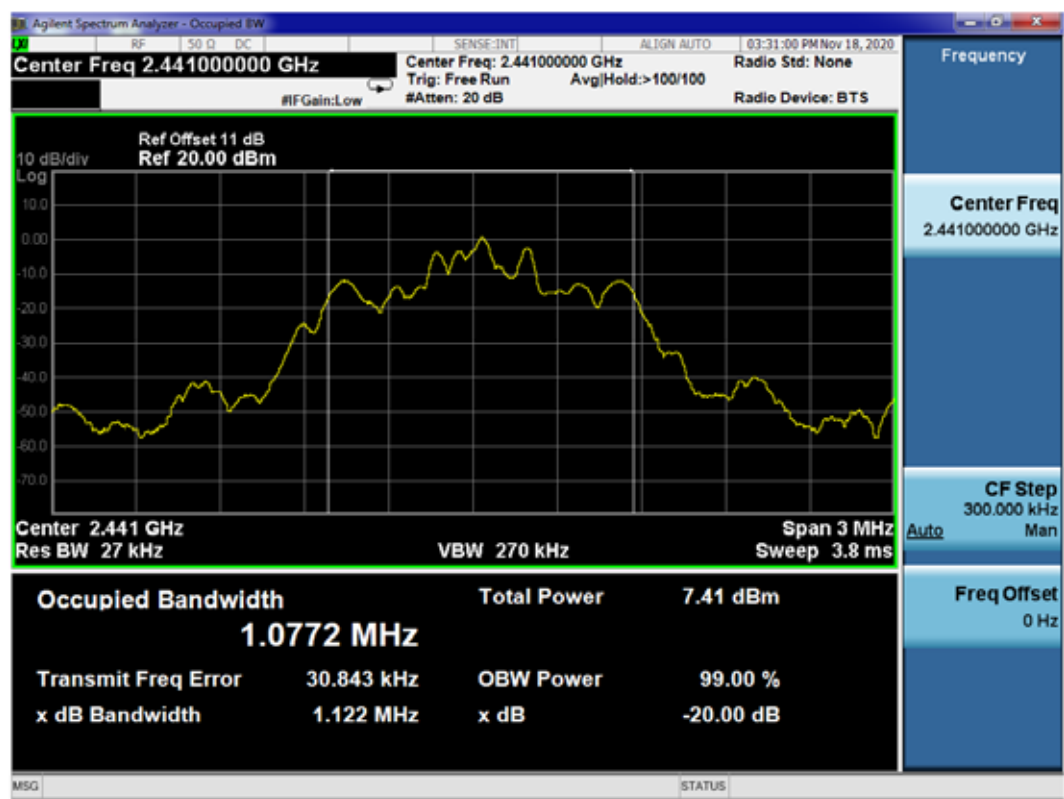
BT 3DH1: CH78 (2480 MHz)



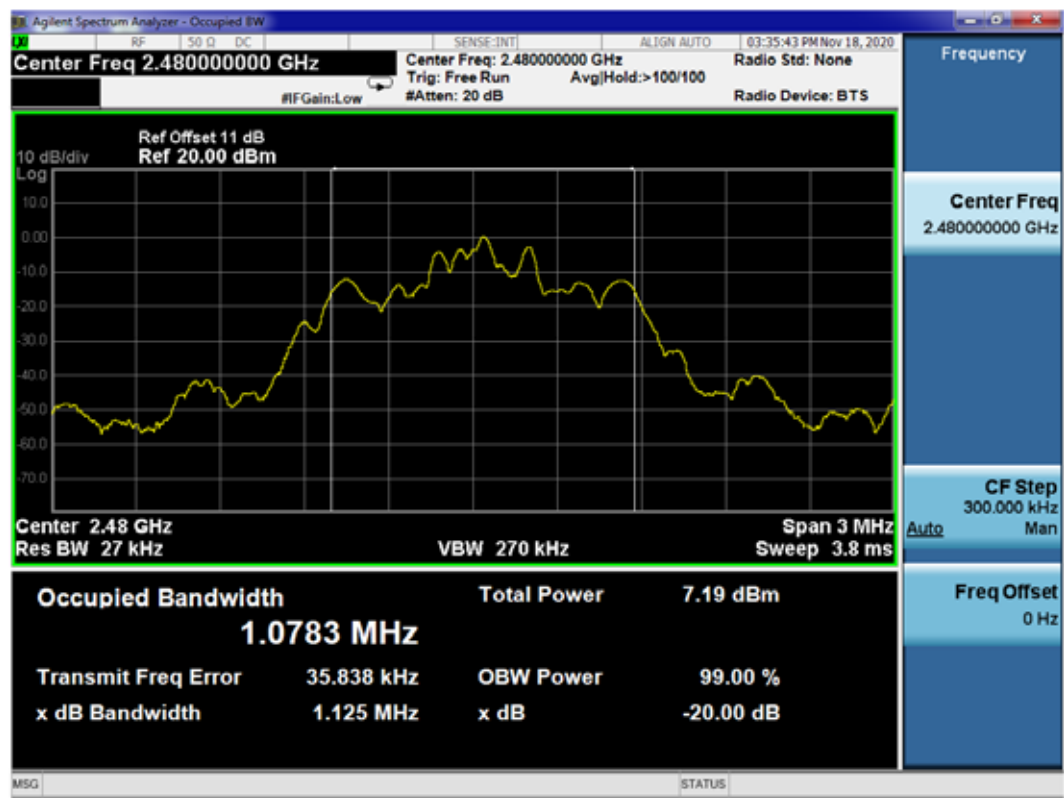
BT 3DH3: CH00 (2402 MHz)



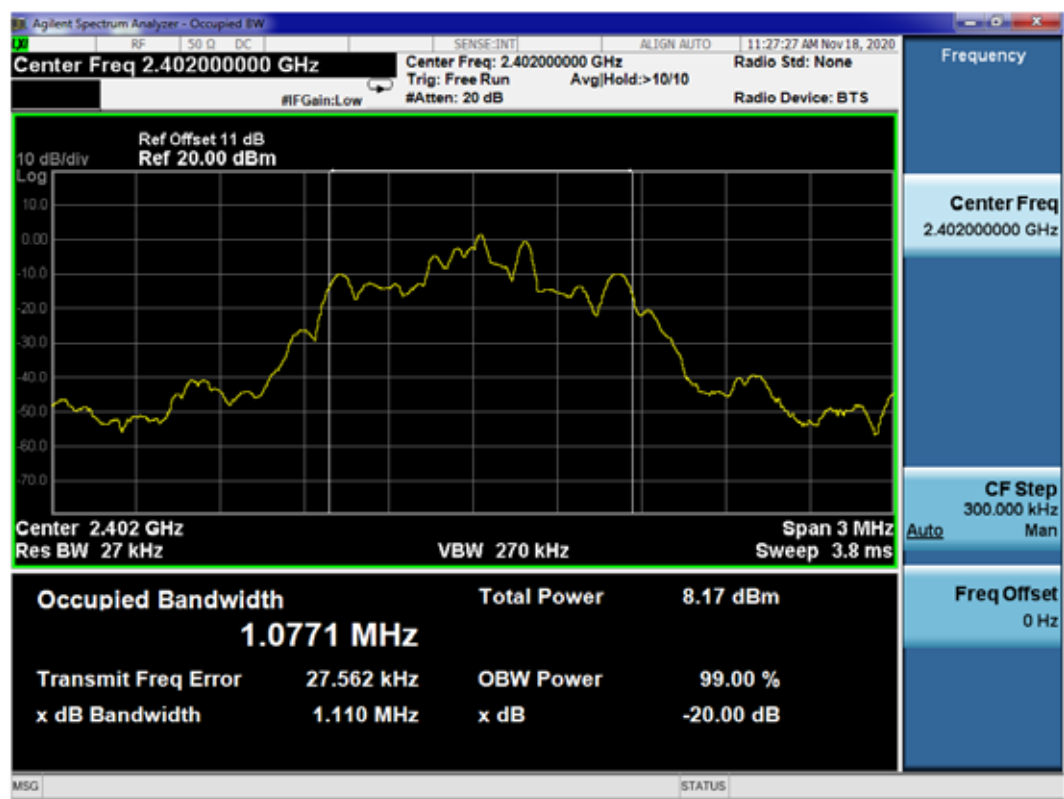
BT 3DH3: CH39 (2441 MHz)



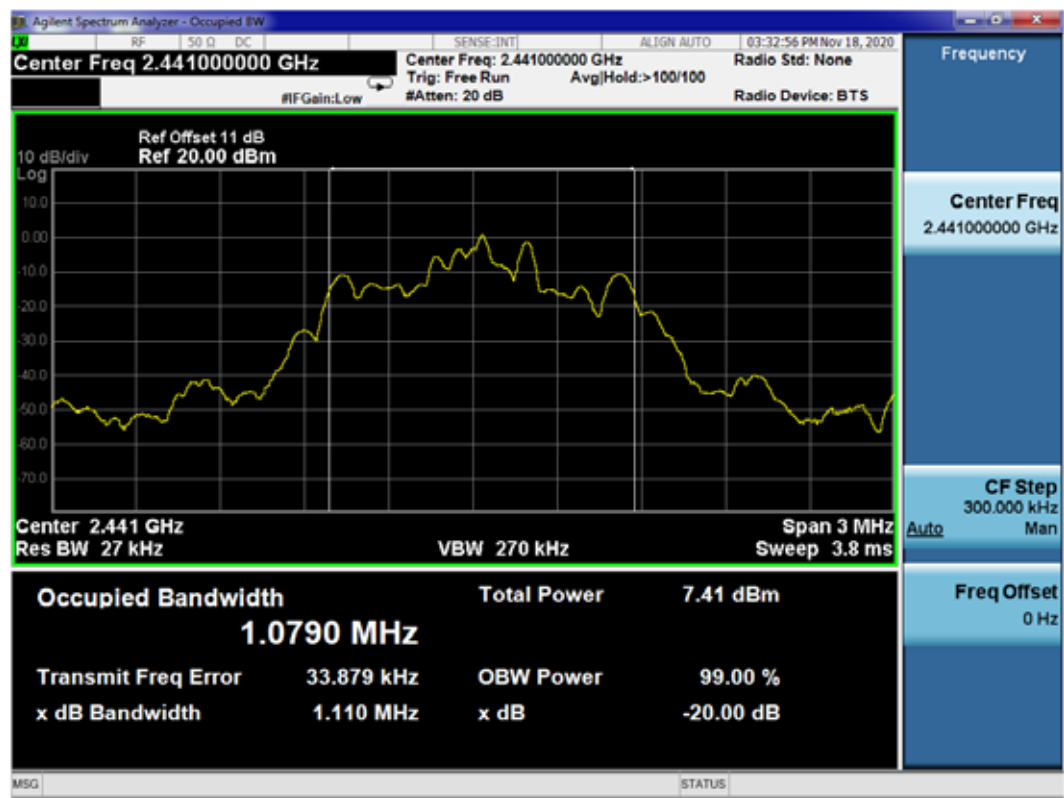
BT 3DH3: CH78 (2480 MHz)



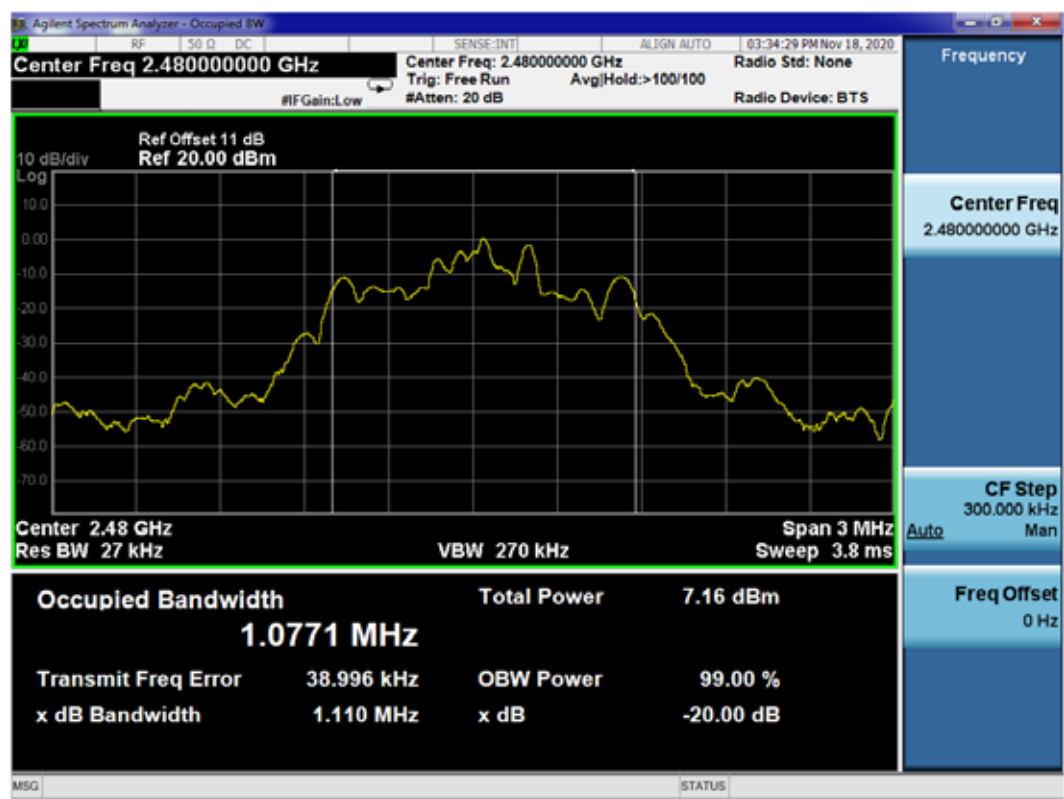
BT 3DH5: CH00 (2402 MHz)



BT 3DH5: CH39 (2441 MHz)



BT 3DH5: CH78 (2480 MHz)



## 6 CARRIER FREQUENCY SEPARATION

### MEASUREMENT

#### 6.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

| Item | Type              | Manufacturer  | Model No.       | Serial No.     | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A          | MY52221182     | 2020.09.16 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F LEX | F02-150819-045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+       | 001            | 2020.08.06 | 1 Year        |

#### 6.2 Block Diagram of Test Setup

The Same as Section. 5.2

#### 6.3 Specification Limits (§15.247(a)(1))

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

#### 6.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to have its hopping function enabled.

#### 6.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = wide enough to capture the peaks of two adjacent channels
- RBW  $\geq$  1% of the span
- VBW  $\geq$  RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Submit this plot.

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure “Carrier Frequency Separation” was used).

## 6.6 Test Results

### **PASSED.**

All the test results are attached in next pages.

(Test Date: 2020.11.18    Temperature: 23°C    Humidity: 51 %)

| Modulation | Channel | Separation<br>(MHz) |
|------------|---------|---------------------|
| BT DH1     | Hopping | <b>1.000</b>        |
| BT DH3     | Hopping | <b>1.000</b>        |
| BT DH5     | Hopping | <b>1.000</b>        |
| BT 3DH1    | Hopping | <b>0.999</b>        |
| BT 3DH3    | Hopping | <b>1.000</b>        |
| BT 3DH5    | Hopping | <b>1.000</b>        |

BT DH1: Hopping



BT DH3: Hopping



## BT DH5: Hopping



## BT 3DH1: Hopping



BT 3DH3: Hopping



BT 3DH5: Hopping



## 7 NUMBER OF HOPPING FREQUENCIES

### MEASUREMENT

#### 7.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

| Item | Type              | Manufacturer  | Model No.       | Serial No.     | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A          | MY52221182     | 2020.09.16 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F LEX | F02-150819-045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+       | 001            | 2020.08.06 | 1 Year        |

#### 7.2 Block Diagram of Test Setup

The Same as Section. 5.2

#### 7.3 Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

#### 7.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to have its hopping function enabled.

#### 7.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = the frequency band of operation
- RBW  $\geq$  1% of the span
- VBW  $\geq$  RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies. Submit this plot(s).

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure “Number of Hopping Frequencies” was used).

## 7.6 Test Results

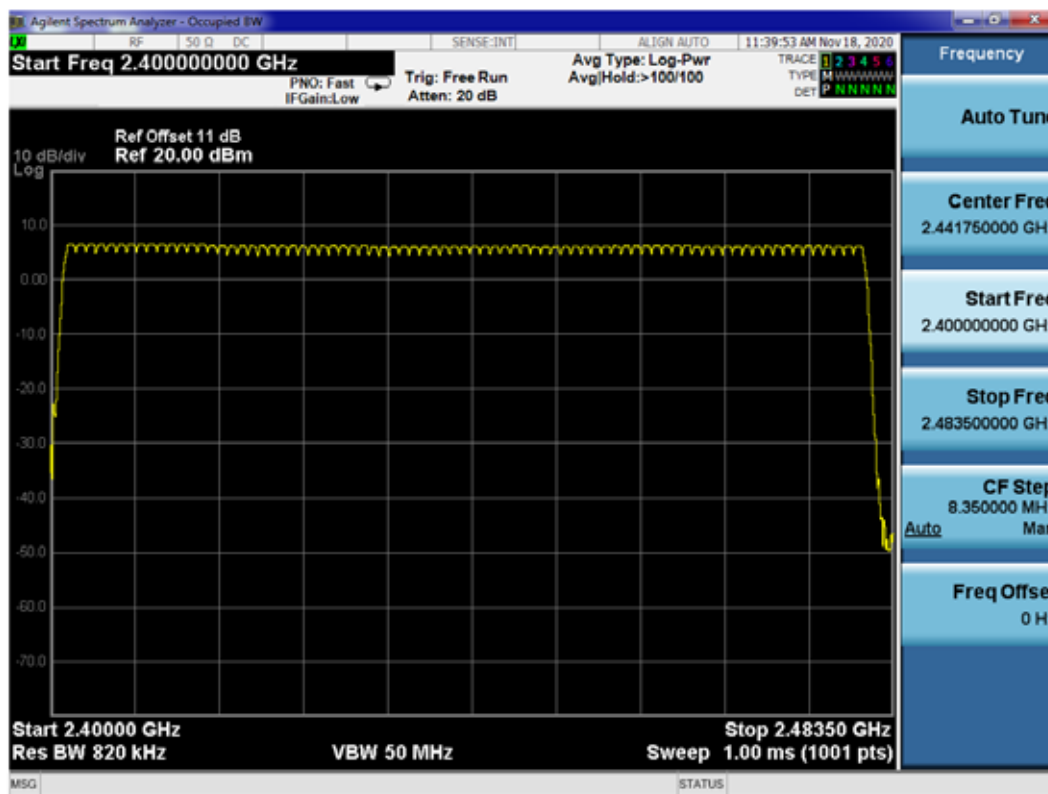
### **PASSED.**

All the test results are attached in next pages.

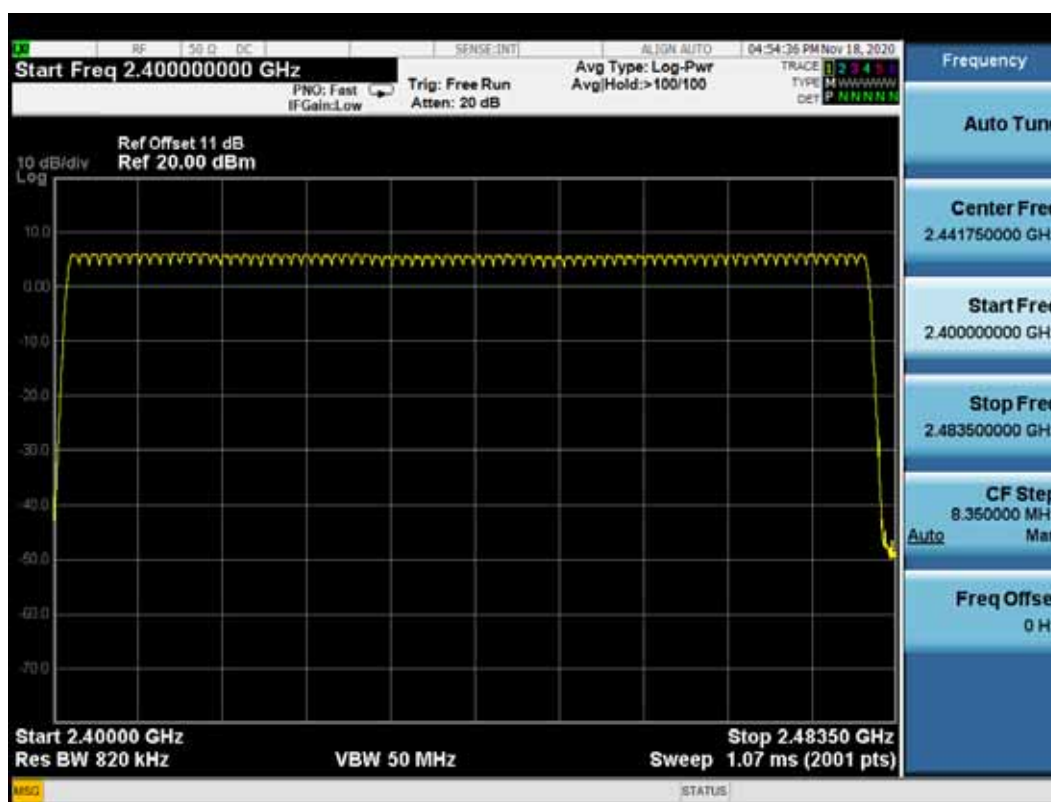
(Test Date: 2020.11.18 Temperature: 23°C Humidity: 51 %)

| Modulation | Number of Hopping Frequencies |
|------------|-------------------------------|
| BT DH1     | 79                            |
| BT DH3     | 79                            |
| BT DH5     | 79                            |
| BT 3DH1    | 79                            |
| BT 3DH3    | 79                            |
| BT 3DH5    | 79                            |

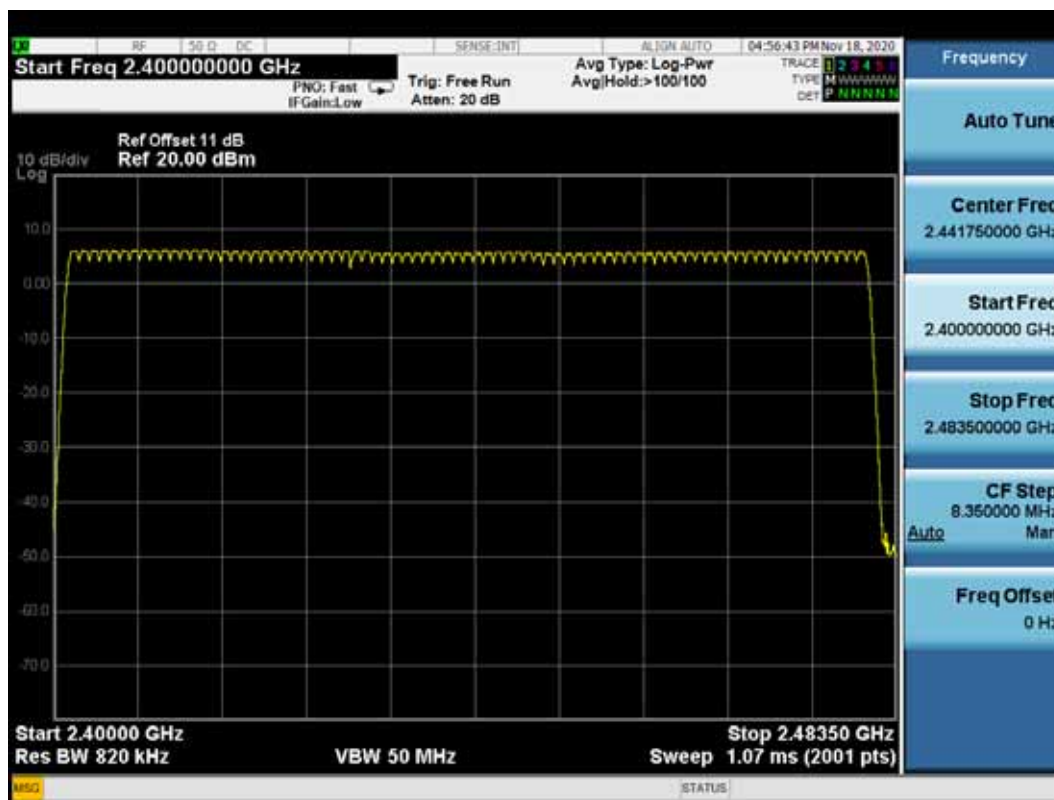
## BT DH1



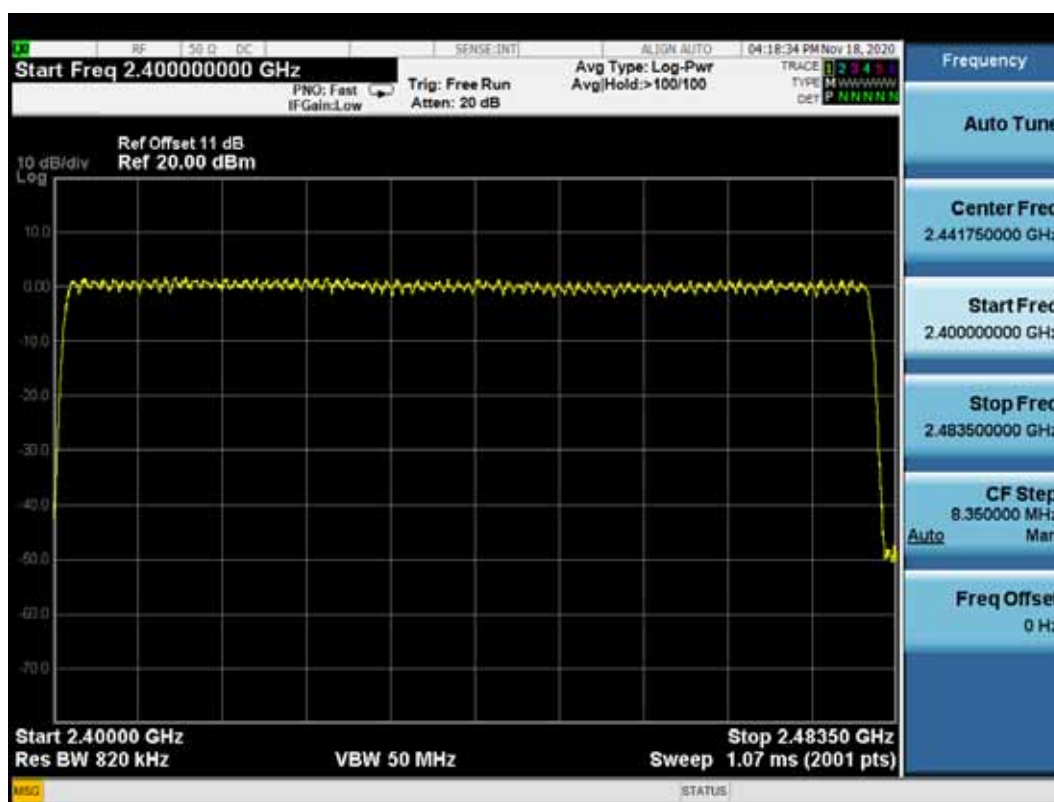
## BT DH3



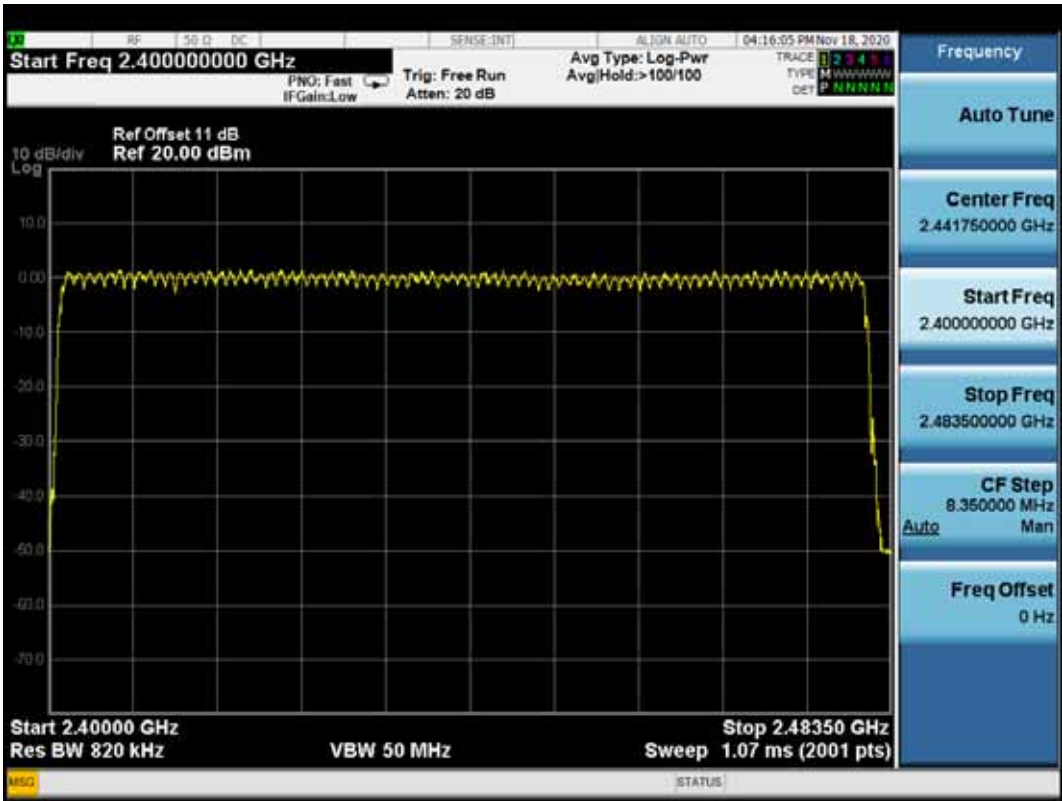
## BT DH5



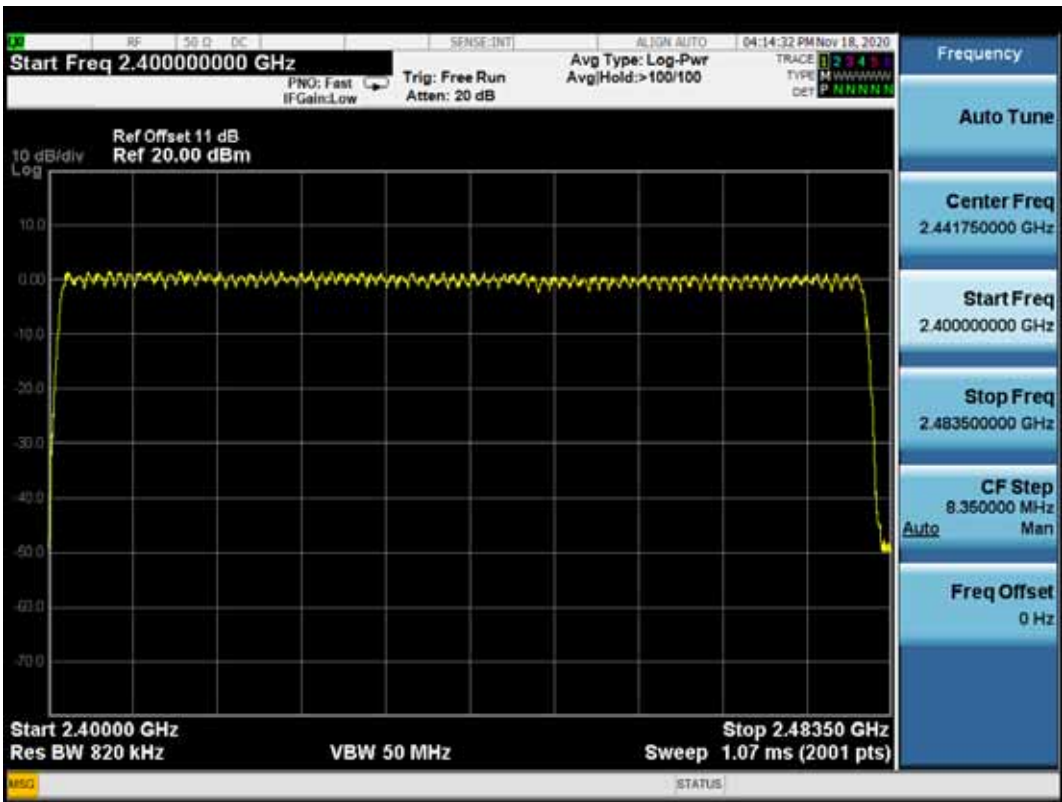
## BT 3DH1



BT 3DH3



BT 3DH5



## 8 DWELL TIME MEASUREMENT

### 8.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

| Item | Type              | Manufacturer  | Model No.          | Serial No.         | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|--------------------|--------------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A             | MY52221182         | 2020.09.16 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F<br>LEX | F02-150819-0<br>45 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+          | 001                | 2020.08.06 | 1 Year        |

### 8.2 Block Diagram of Test Setup

The Same as Section. 5.2

### 8.3 Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 8.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to have its hopping function enabled.

### 8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- a) Span = zero span, centered on a hopping channel
- b) RBW = 1 MHz
- c) VBW  $\geq$  RBW
- d) Sweep = as necessary to capture the entire dwell time per hopping channel
- e) Detector function = peak
- f) Trace = max hold

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure “ Time of Occupancy (Dwell Time)” was used).

## 8.6 Test Results

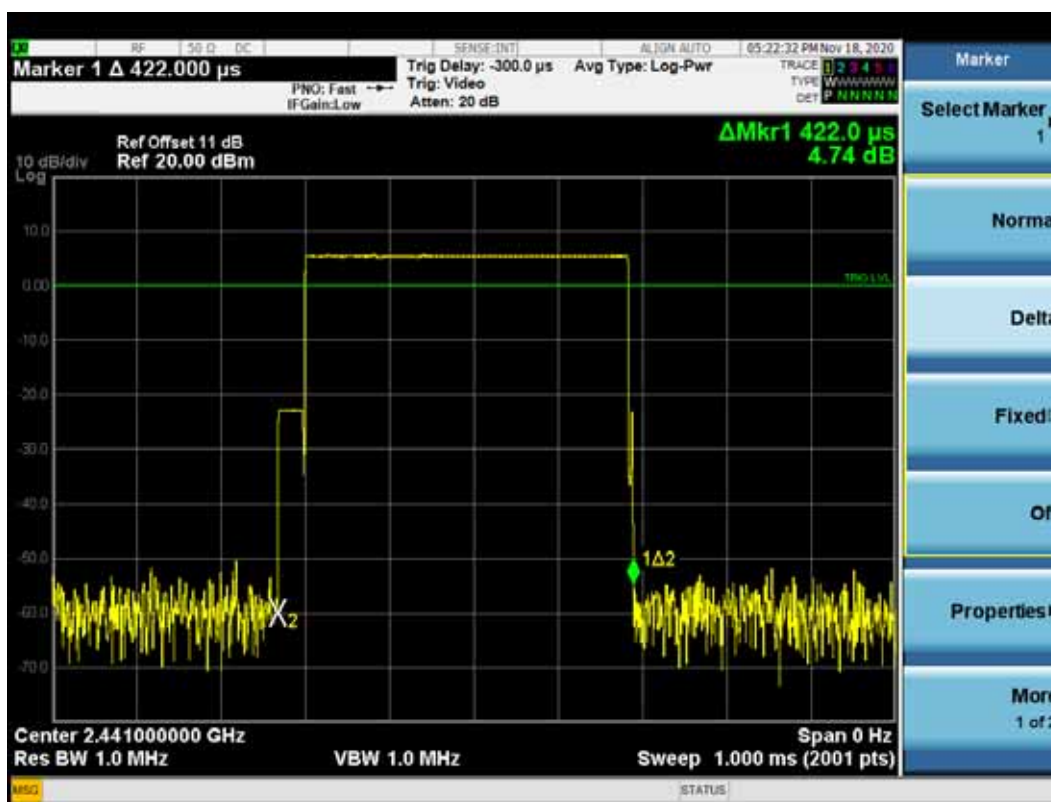
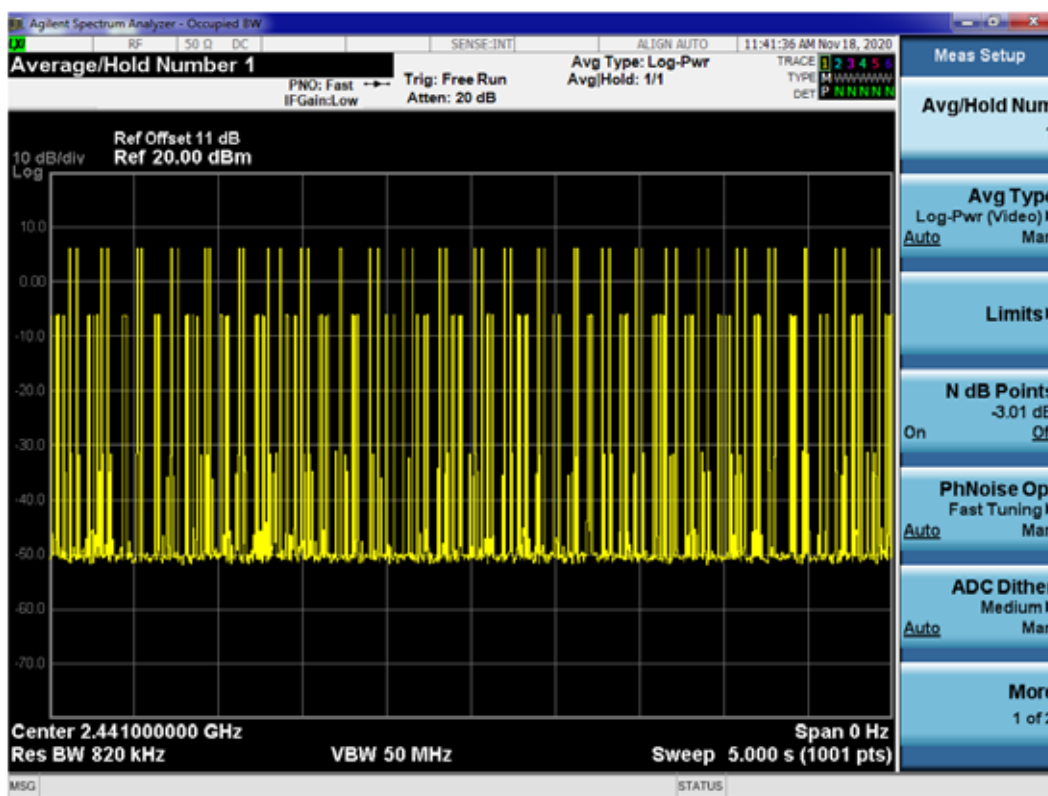
### **PASSED.**

All the test results are attached in next pages.

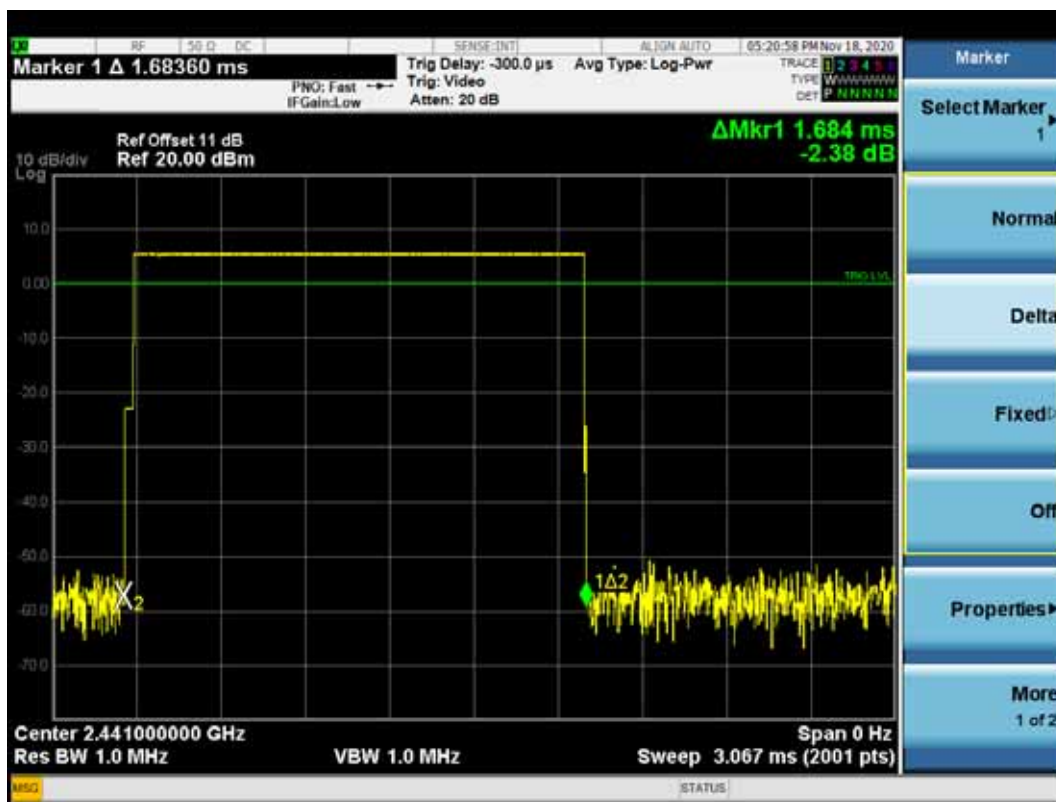
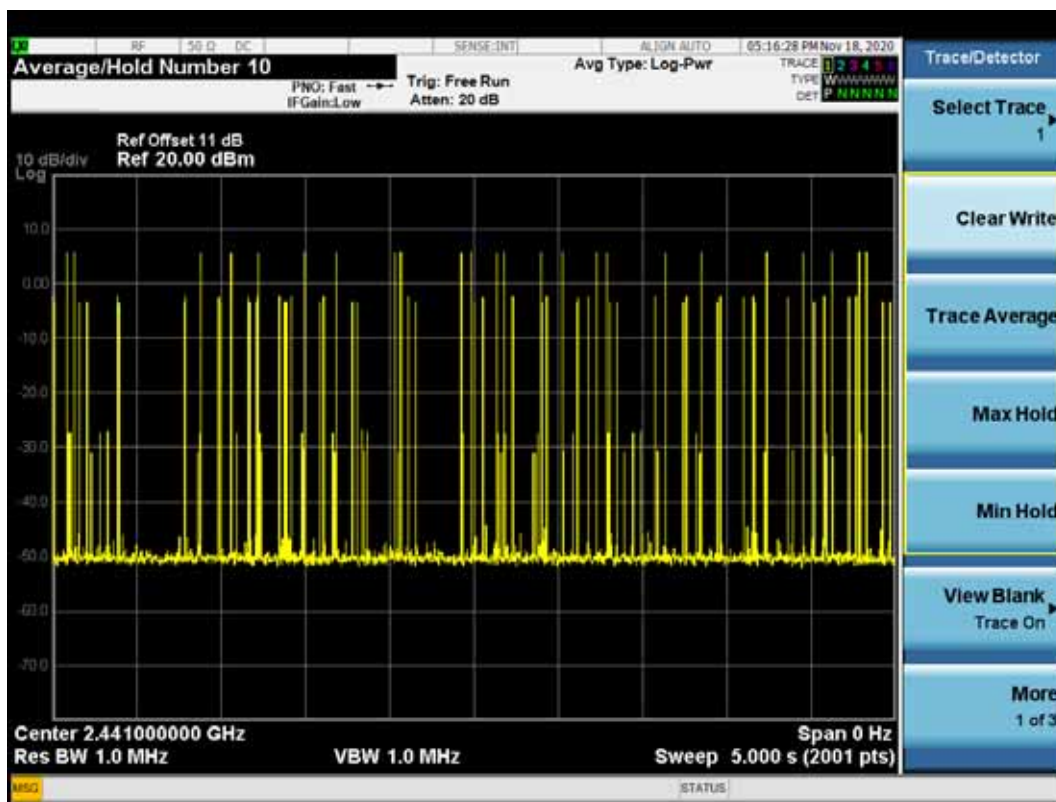
(Test Date: 2020.11.18 Temperature: 23°C Humidity: 51 %)

| Modulation | Dwell Time                                                                                             | Limit  |
|------------|--------------------------------------------------------------------------------------------------------|--------|
| BT DH1     | $48\text{hops}/5\text{s} \times 0.4 \times 79\text{channels} \times 0.422\text{ms} = 128.018\text{ms}$ | 400 ms |
| BT DH3     | $24\text{hops}/5\text{s} \times 0.4 \times 79\text{channels} \times 1.684\text{ms} = 255.429\text{ms}$ | 400 ms |
| BT DH5     | $35\text{hops}/5\text{s} \times 0.4 \times 79\text{channels} \times 2.928\text{ms} = 323.837\text{ms}$ | 400 ms |
| BT 3DH1    | $51\text{hops}/5\text{s} \times 0.4 \times 79\text{channels} \times 0.428\text{ms} = 137.953\text{ms}$ | 400 ms |
| BT 3DH3    | $26\text{hops}/5\text{s} \times 0.4 \times 79\text{channels} \times 1.681\text{ms} = 276.222\text{ms}$ | 400 ms |
| BT 3DH5    | $35\text{hops}/5\text{s} \times 0.4 \times 79\text{channels} \times 2.934\text{ms} = 324.500\text{ms}$ | 400 ms |

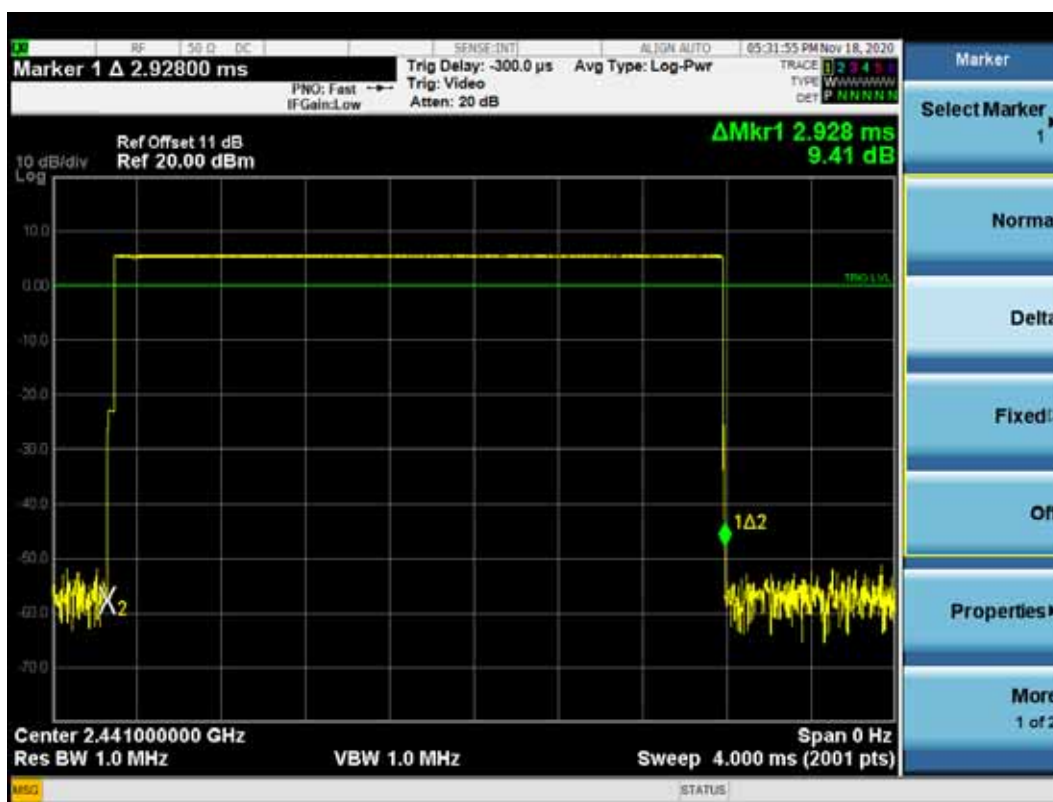
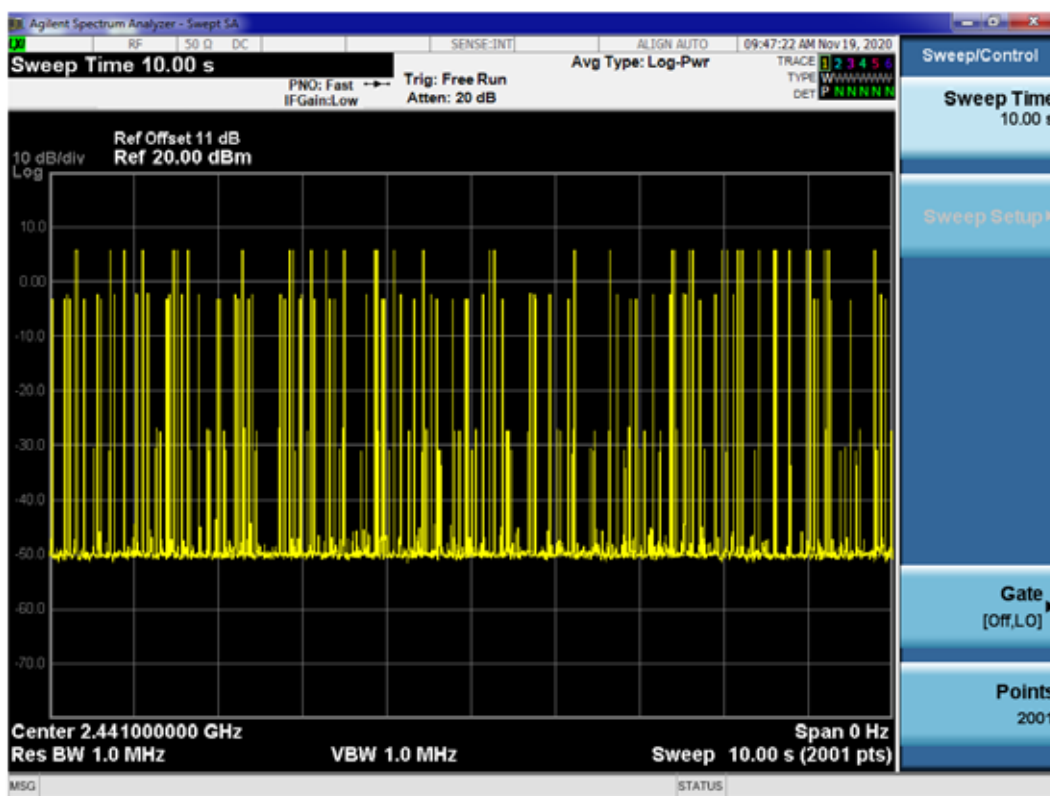
## BT DH1



## BT DH3



## BT DH5



Marker 1  $\Delta$  427.500  $\mu$ s

Trig Delay: -300.0  $\mu$ s Avg Type: Log-Pwr

PNO: Fast IF Gain: Low Trig: Video Atten: 20 dB

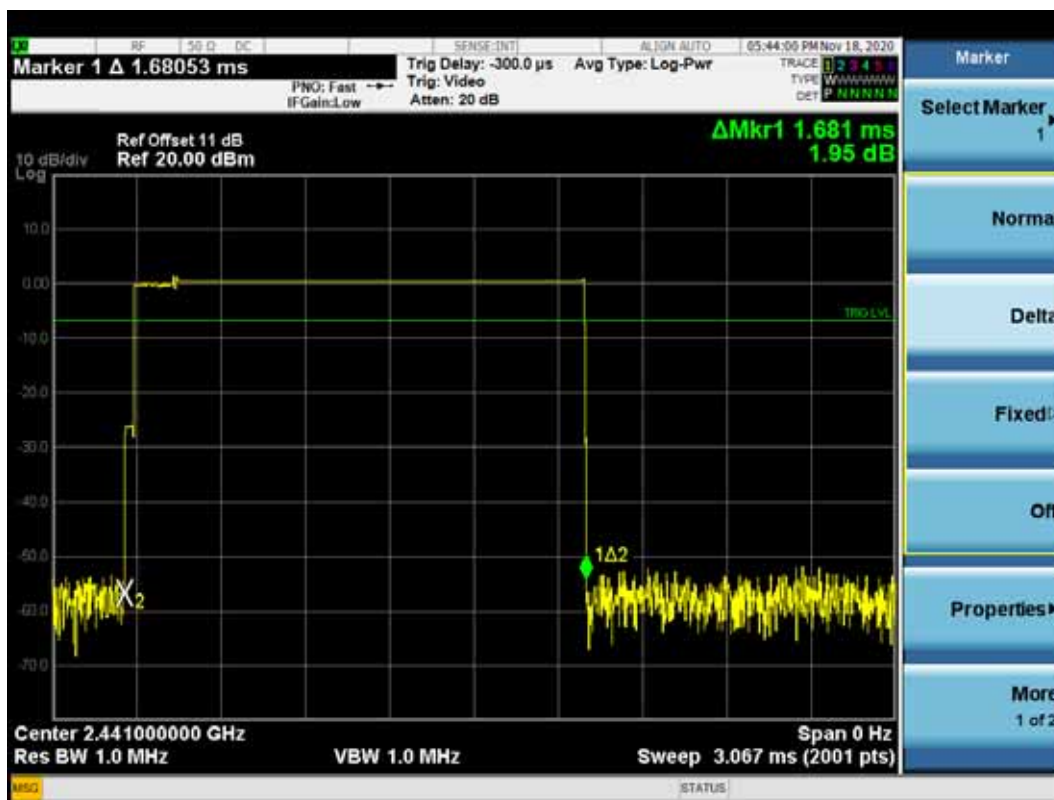
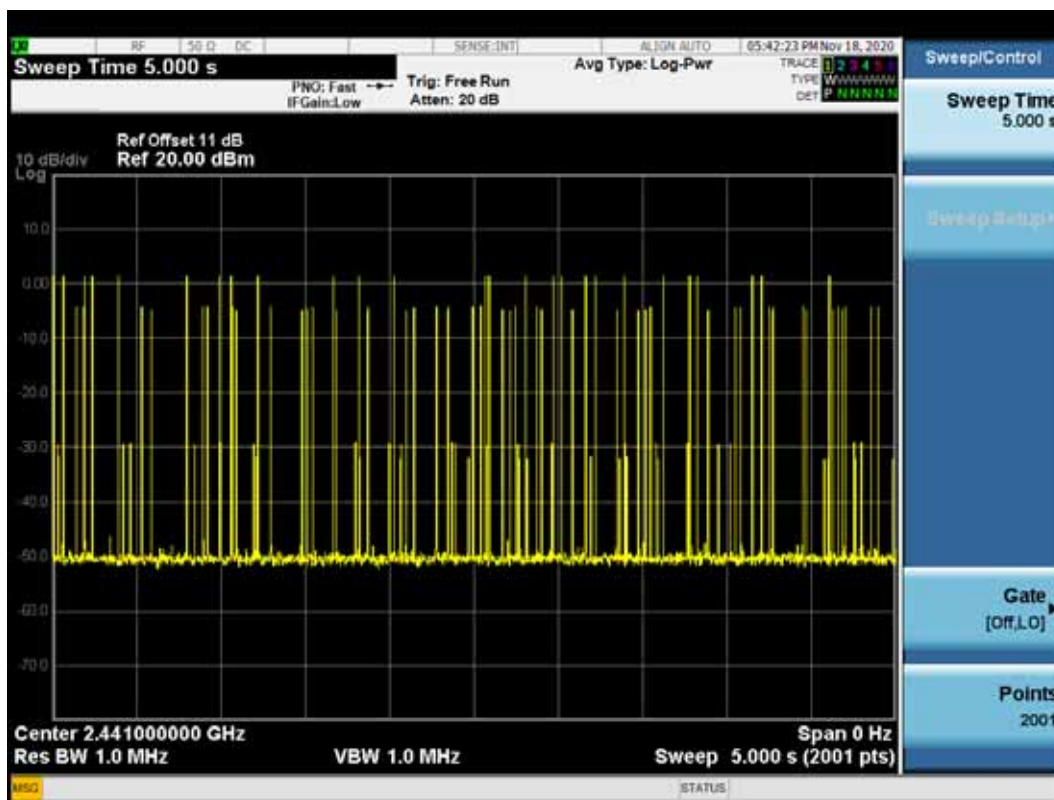
Ref Offset 11 dB Ref 20.00 dBm

$\Delta$ Mkr1 427.5  $\mu$ s -11.67 dB

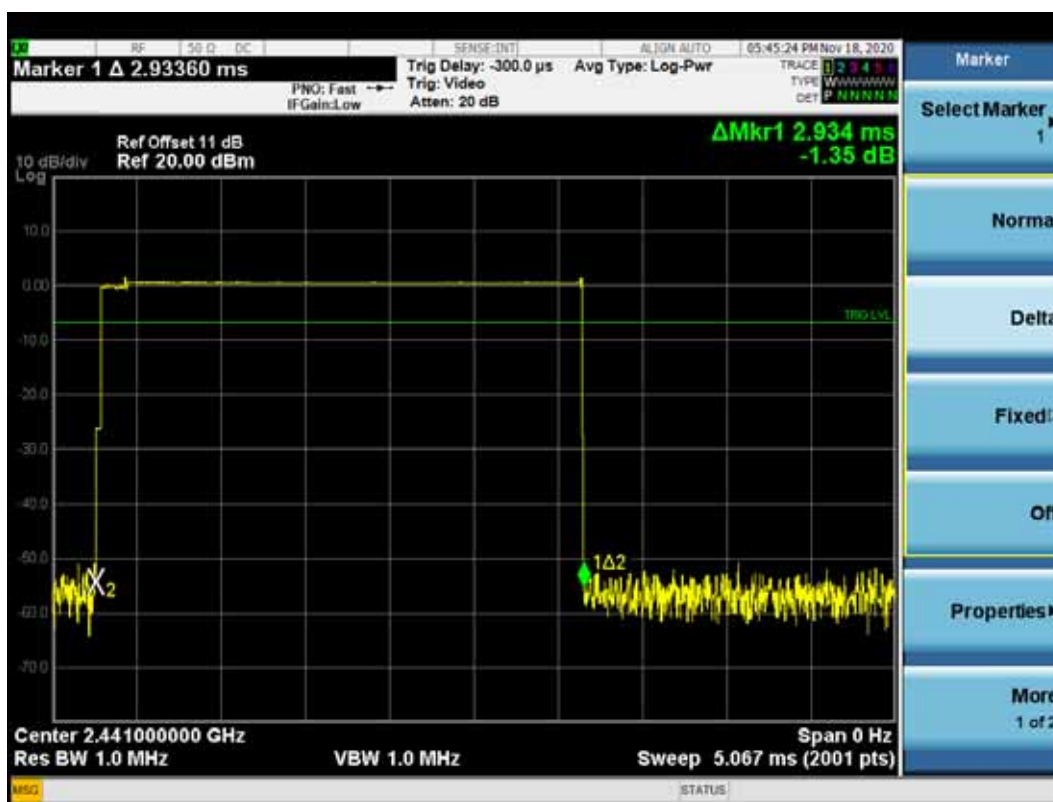
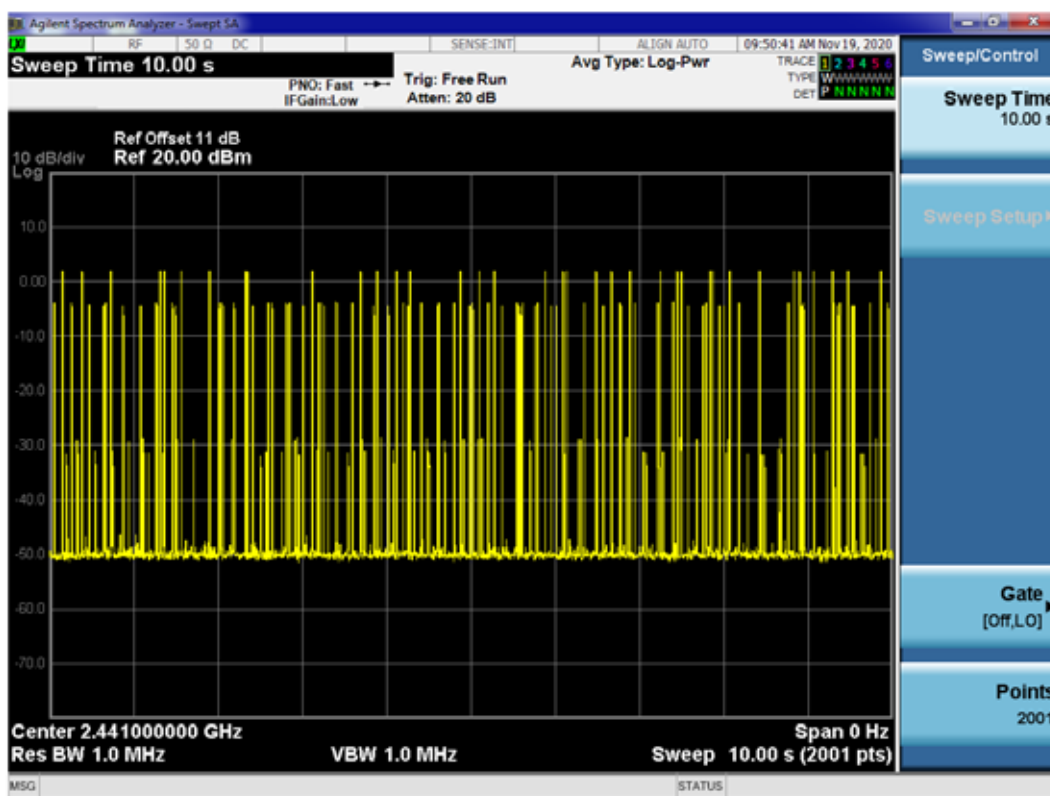
Center 2.441000000 GHz Span 0 Hz

Res BW 1.0 MHz VBW 1.0 MHz Sweep 1.000 ms (2001 pts)

## BT 3DH3



## BT 3DH5



## 9 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 9.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

| Item | Type              | Manufacturer  | Model No.       | Serial No.     | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A          | MY52221182     | 2020.09.16 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F LEX | F02-150819-045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+       | 001            | 2020.08.06 | 1 Year        |

### 9.2 Block Diagram of Test Setup

The Same as Section. 5.2

### 9.3 Specification Limits (§15.247(b)(1))

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

### 9.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

### 9.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

Use the following spectrum analyzer settings:

- Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
- RBW > the 20 dB bandwidth of the emission being measured
- VBW  $\geq$  RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power. The limit is specified in one of the subparagraphs of this Section. Submit this plot. A peak responding power meter may be used instead of a spectrum analyzer.

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure “Peak Output Power” was used).

## 9.6 Test Results

### **PASSED.**

All the test results are attached in next pages.

(Test Date: 2020.11.19 Temperature: 23°C Humidity: 51 %)

| Modulation | Channel | Frequency (MHz) | Peak Output Power (dBm) | Limit  |
|------------|---------|-----------------|-------------------------|--------|
| BT DH1     | 00      | 2402            | <b>6.327</b>            | 30 dBm |
|            | 39      | 2441            | <b>5.900</b>            | 30 dBm |
|            | 78      | 2480            | <b>5.936</b>            | 30 dBm |
| BT DH3     | 00      | 2402            | <b>6.261</b>            | 30 dBm |
|            | 39      | 2441            | <b>5.926</b>            | 30 dBm |
|            | 78      | 2480            | <b>5.954</b>            | 30 dBm |
| BT DH5     | 00      | 2402            | <b>6.290</b>            | 30 dBm |
|            | 39      | 2441            | <b>5.946</b>            | 30 dBm |
|            | 78      | 2480            | <b>5.922</b>            | 30 dBm |
| BT 3DH1    | 00      | 2402            | <b>2.387</b>            | 30 dBm |
|            | 39      | 2441            | <b>1.909</b>            | 30 dBm |
|            | 78      | 2480            | <b>1.906</b>            | 30 dBm |
| BT 3DH3    | 00      | 2402            | <b>2.303</b>            | 30 dBm |
|            | 39      | 2441            | <b>1.820</b>            | 30 dBm |
|            | 78      | 2480            | <b>1.779</b>            | 30 dBm |
| BT 3DH5    | 00      | 2402            | <b>2.349</b>            | 30 dBm |
|            | 39      | 2441            | <b>1.866</b>            | 30 dBm |
|            | 78      | 2480            | <b>1.827</b>            | 30 dBm |

BT DH1: CH00 (2402 MHz)



BT DH1: CH39 (2441 MHz)



## BT DH1: CH78 (2480 MHz)



## BT DH3: CH00 (2402 MHz)



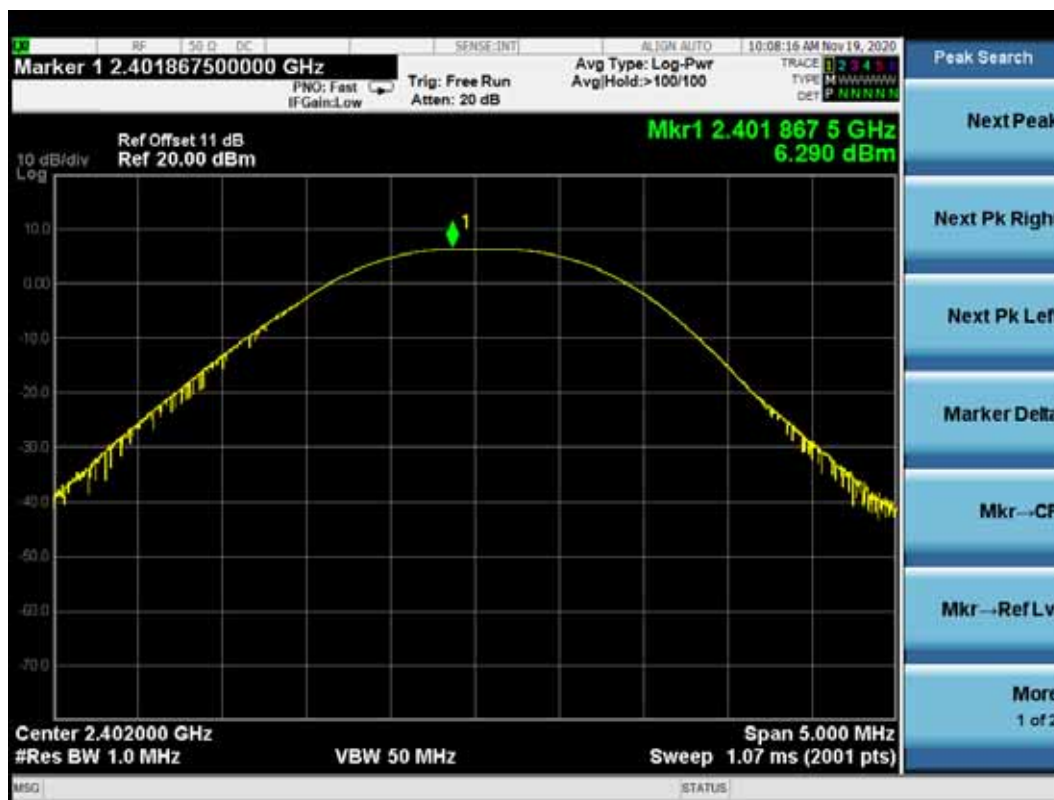
## BT DH3: CH39 (2441 MHz)



## BT DH3: CH78 (2480 MHz)



## BT DH5: CH00 (2402 MHz)



## BT DH5: CH39 (2441 MHz)



BT DH5: CH78 (2480 MHz)



BT 3DH1: CH00 (2402 MHz)



## BT 3DH1: CH39 (2441 MHz)



## BT 3DH1: CH78 (2480 MHz)



BT 3DH3: CH00 (2402 MHz)



BT 3DH3: CH39 (2441 MHz)



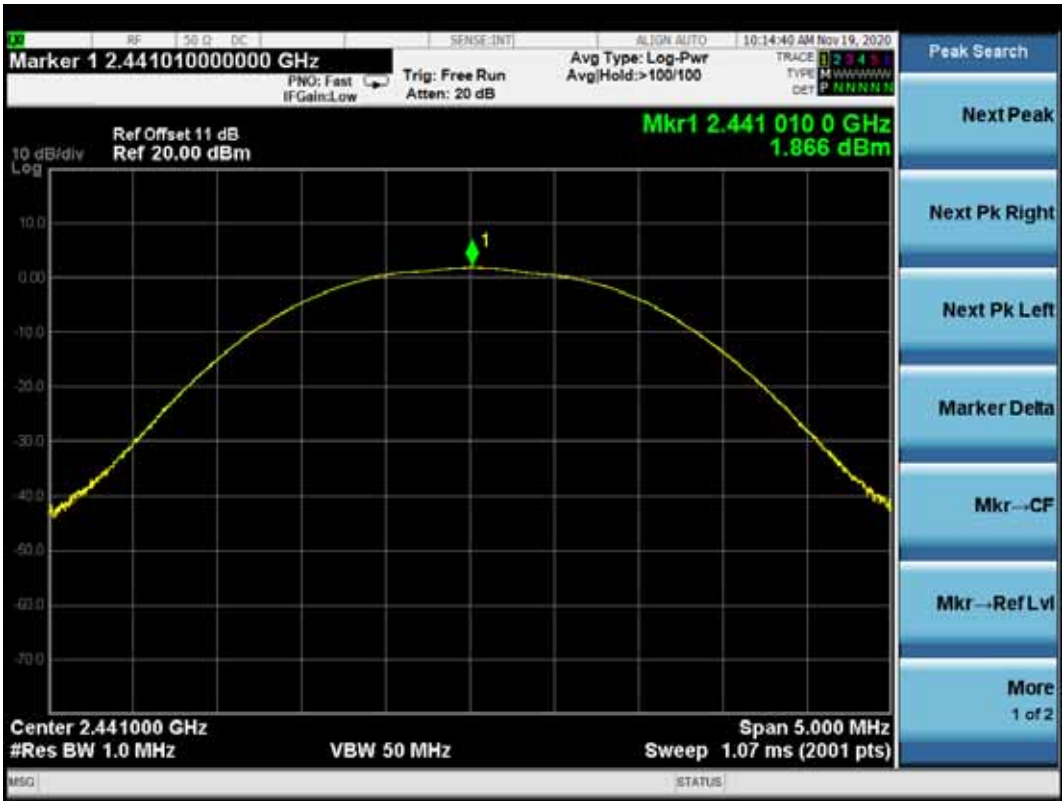
## BT 3DH3: CH78 (2480 MHz)



## BT 3DH5: CH00 (2402 MHz)



BT 3DH5: CH39 (2441 MHz)



BT 3DH5: CH78 (2480 MHz)



## 10 BAND EDGE MEASUREMENT

### 10.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

| Item | Type              | Manufacturer  | Model No.       | Serial No.     | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A          | MY52221182     | 2020.09.16 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F LEX | F02-150819-045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+       | 001            | 2020.08.06 | 1 Year        |

### 10.2 Block Diagram of Test Setup

The Same as Section. 5.2

### 10.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see§15.205(c)). (※This test result attaching to §4.7)

### 10.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one and have its hopping function enabled.

### 10.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

Use the following spectrum analyzer settings:

- Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
- RBW  $\geq$  1% of the span
- VBW  $\geq$  RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize. Set the marker on the emission at the band edge,

or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section. Submit this plot.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit. Submit this plot.

The test procedure is defined in FCC Public Notice DA 00-705, Mar.2000 (the Procedure “ Band-edge Compliance of RF Conducted Emissions” was used).

## 10.6 Test Results

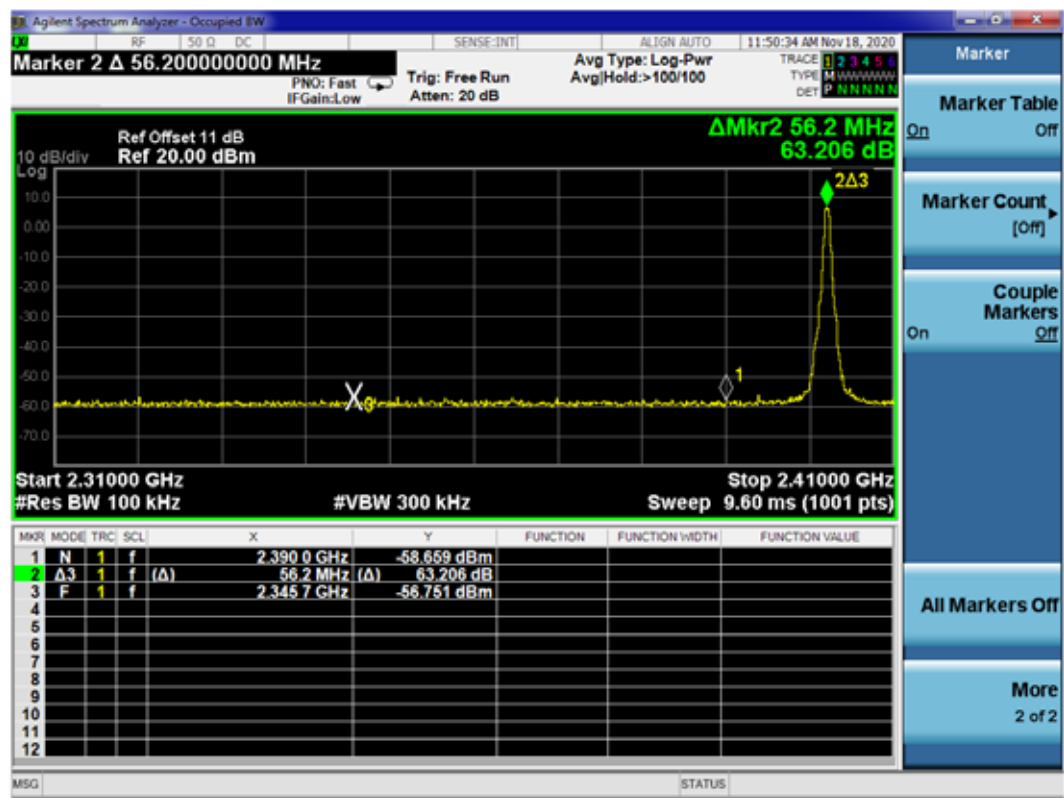
**PASSED.**

All the test results are attached in next pages.

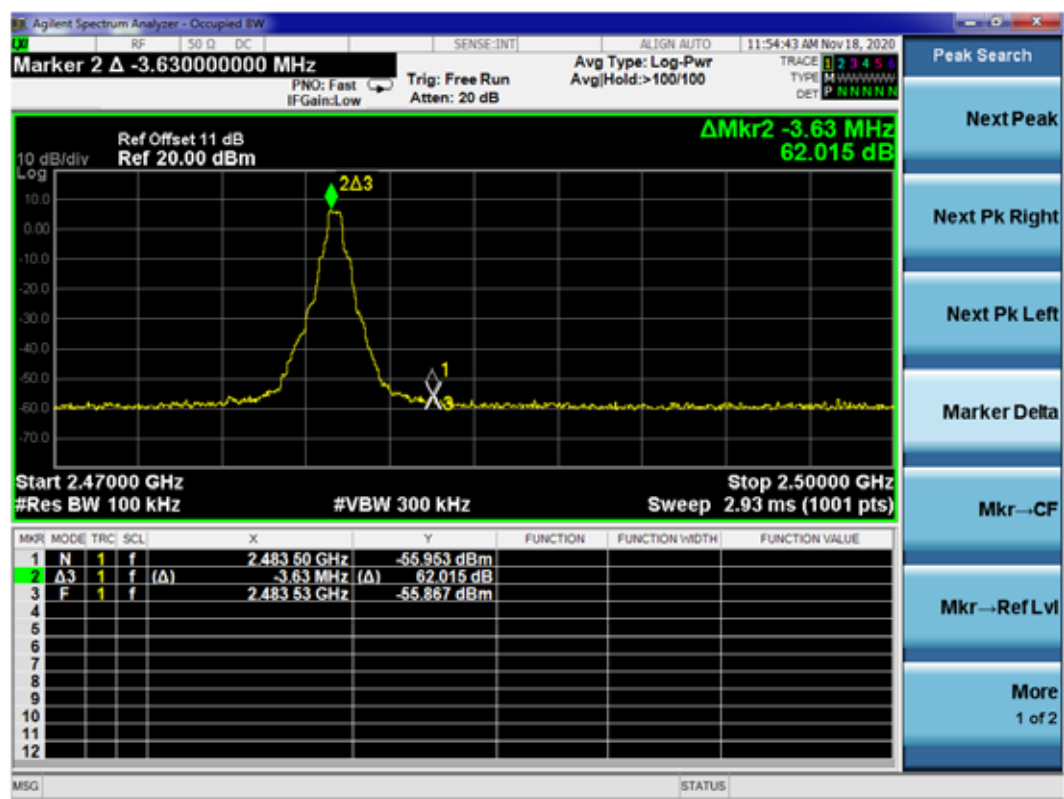
(Test Date: 2020.11.18 Temperature: 23°C Humidity: 51 %)

| Modulation      | Location   | Channel | Frequency (MHz) | Delta Marker (dB) |
|-----------------|------------|---------|-----------------|-------------------|
| BT DH1          | Lower Edge | 00      | 2402            | <b>63.206</b>     |
|                 | Upper Edge | 78      | 2480            | <b>62.015</b>     |
| BT DH3          | Lower Edge | 00      | 2402            | <b>63.157</b>     |
|                 | Upper Edge | 78      | 2480            | <b>62.623</b>     |
| BT DH5          | Lower Edge | 00      | 2402            | <b>63.045</b>     |
|                 | Upper Edge | 78      | 2480            | <b>61.107</b>     |
| BT 3DH1         | Lower Edge | 00      | 2402            | <b>58.637</b>     |
|                 | Upper Edge | 78      | 2480            | <b>57.681</b>     |
| BT 3DH3         | Lower Edge | 00      | 2402            | <b>59.167</b>     |
|                 | Upper Edge | 78      | 2480            | <b>58.650</b>     |
| BT 3DH5         | Lower Edge | 00      | 2402            | <b>59.091</b>     |
|                 | Upper Edge | 78      | 2480            | <b>58.076</b>     |
| BT DH1 Hopping  | Lower Edge | Hopping |                 | <b>63.049</b>     |
|                 | Upper Edge | Hopping |                 | <b>60.846</b>     |
| BT DH3 Hopping  | Lower Edge | Hopping |                 | <b>63.221</b>     |
|                 | Upper Edge | Hopping |                 | <b>61.210</b>     |
| BT DH5 Hopping  | Lower Edge | Hopping |                 | <b>62.829</b>     |
|                 | Upper Edge | Hopping |                 | <b>60.754</b>     |
| BT 3DH1 Hopping | Lower Edge | Hopping |                 | <b>58.392</b>     |
|                 | Upper Edge | Hopping |                 | <b>58.046</b>     |
| BT 3DH3 Hopping | Lower Edge | Hopping |                 | <b>58.742</b>     |
|                 | Upper Edge | Hopping |                 | <b>57.175</b>     |
| BT 3DH5 Hopping | Lower Edge | Hopping |                 | <b>58.074</b>     |
|                 | Upper Edge | Hopping |                 | <b>57.350</b>     |

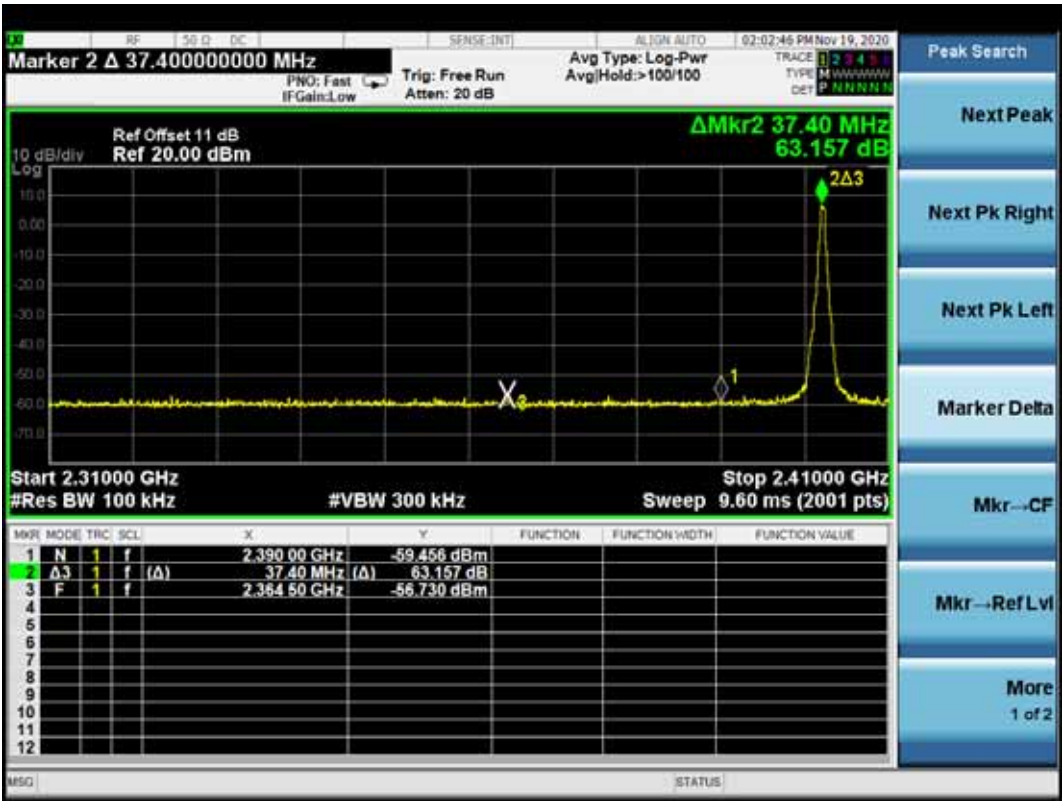
BT DH1: CH00 (2402 MHz)



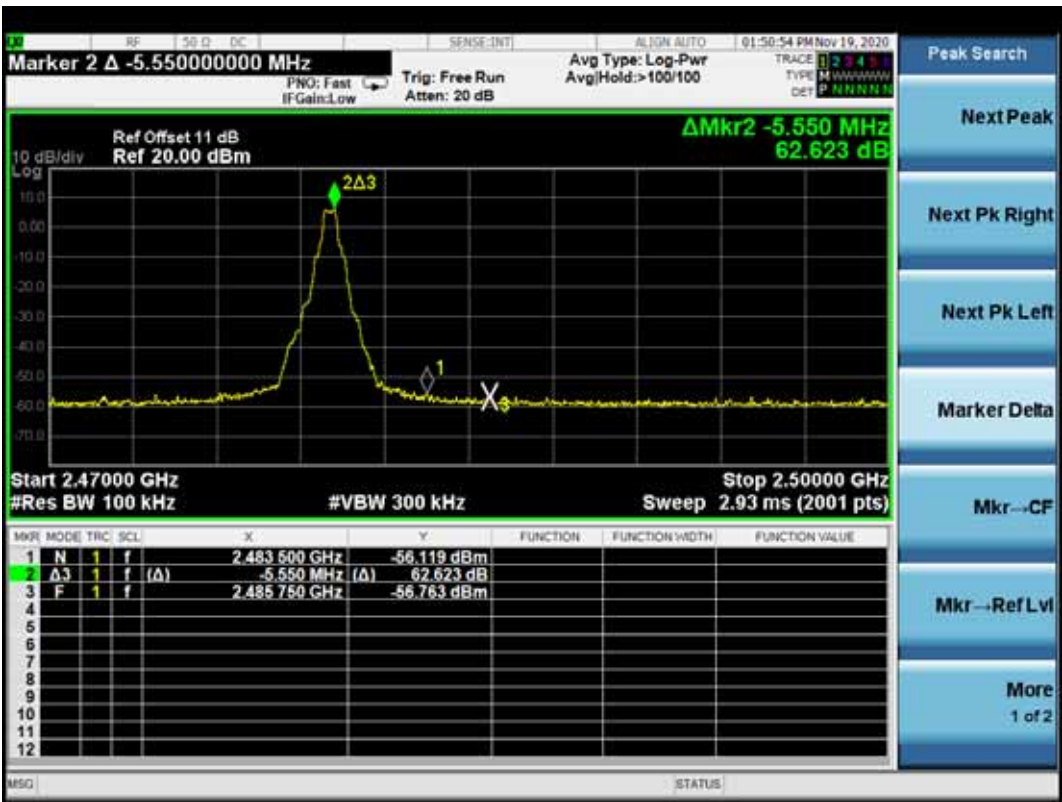
BT DH1: CH79 (2480 MHz)



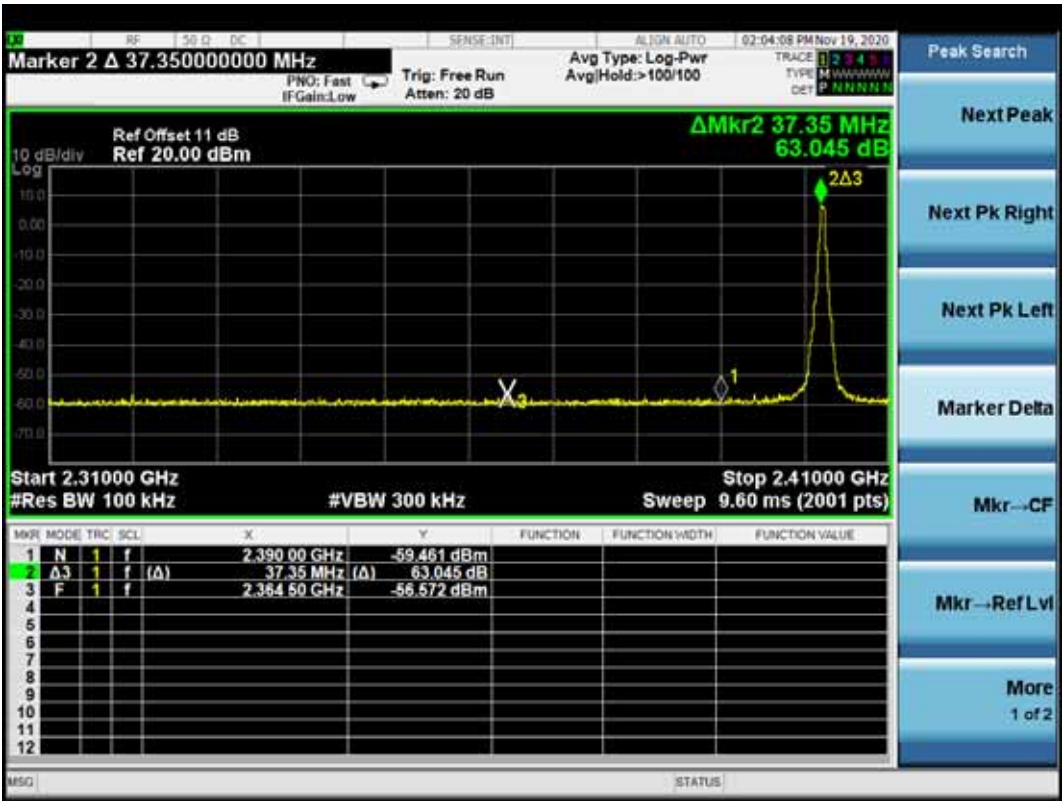
BT DH3: CH00 (2402 MHz)



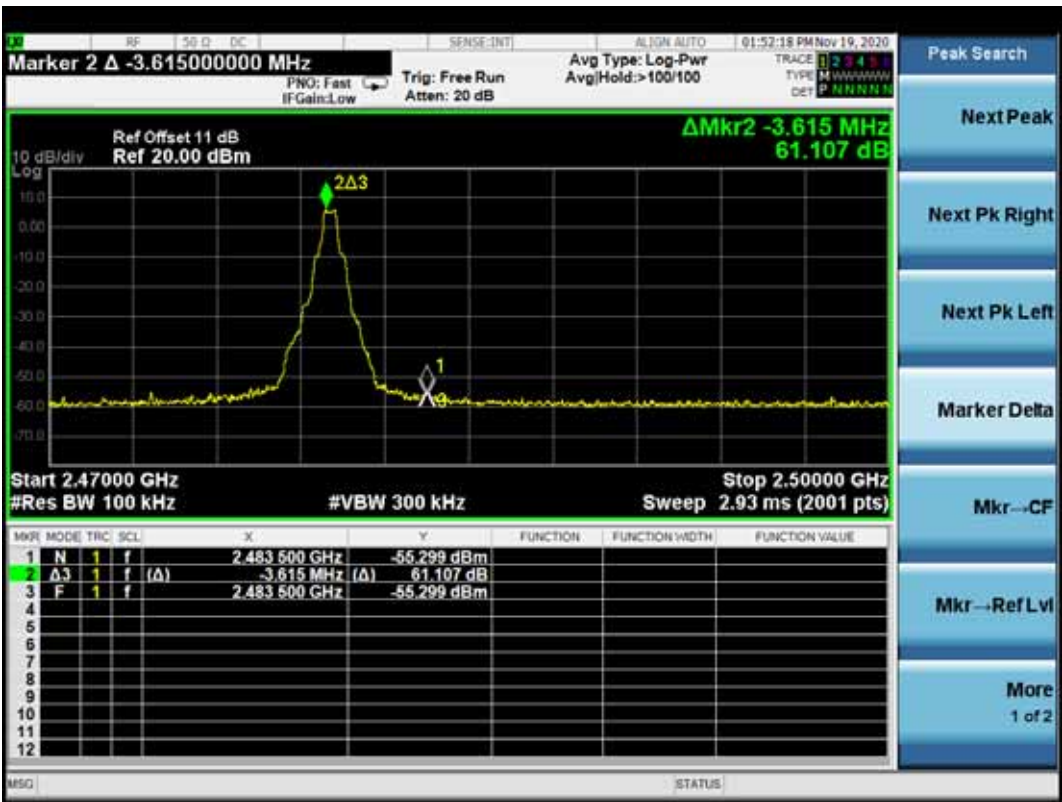
BT DH3: CH79 (2480 MHz)



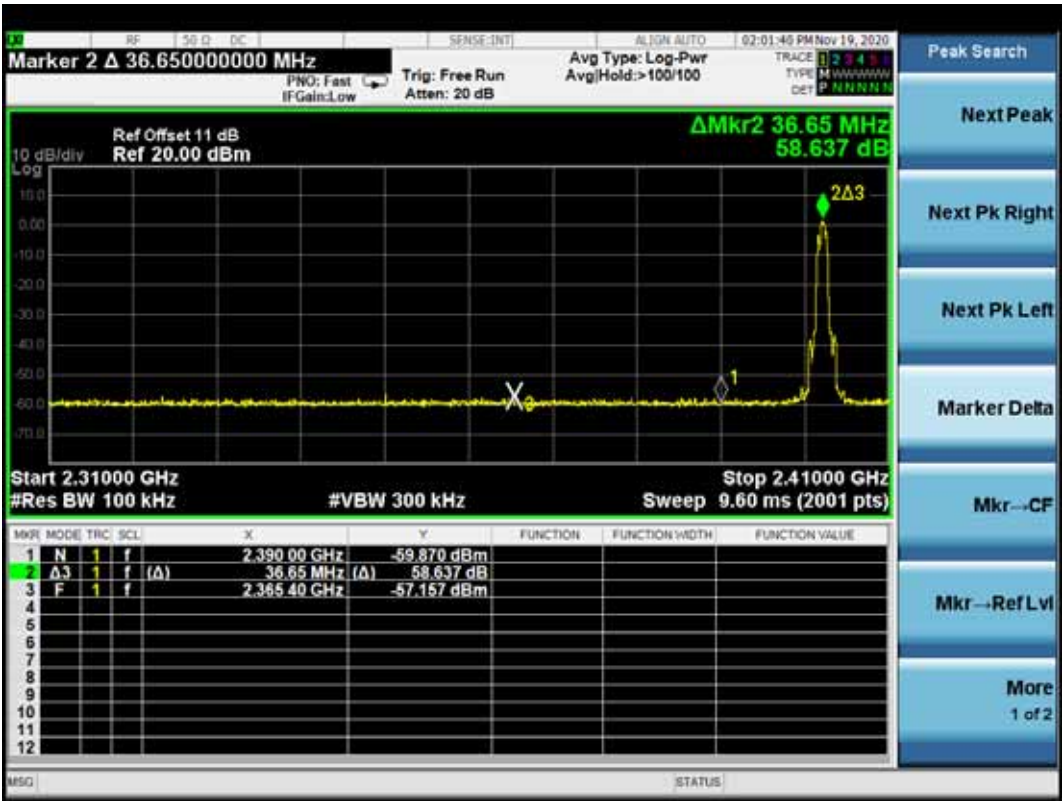
BT DH5: CH00 (2402 MHz)



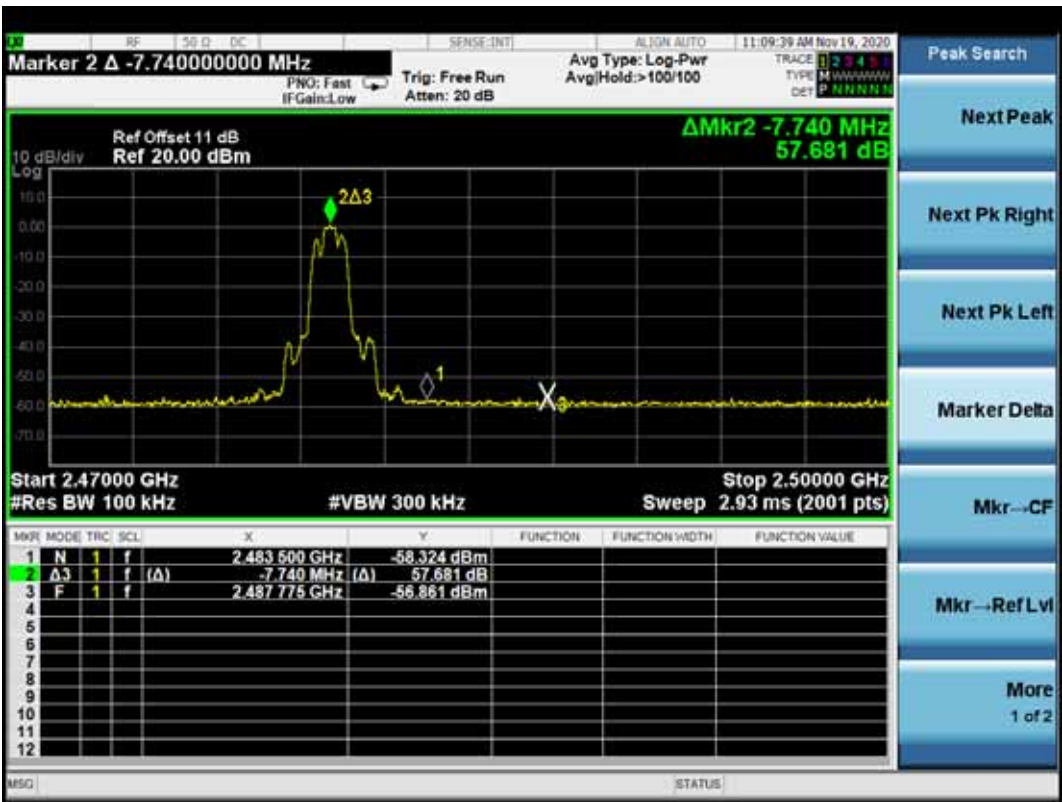
BT DH5: CH79 (2480 MHz)



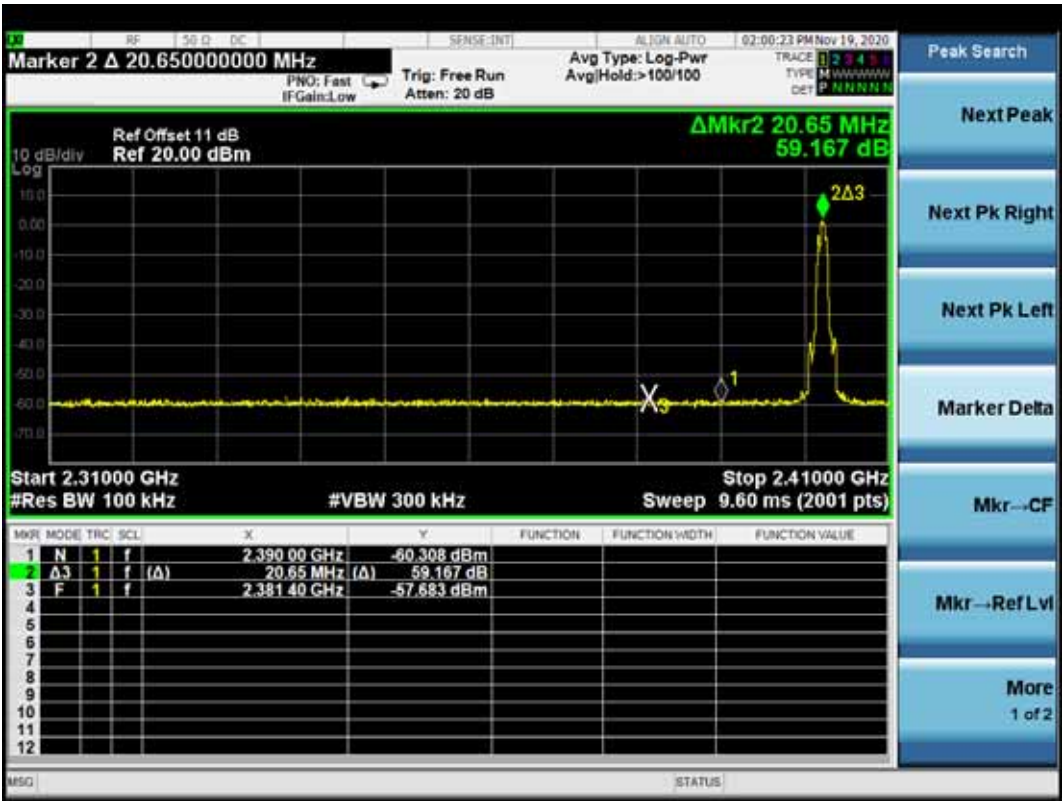
BT 3DH1: CH00 (2402 MHz)



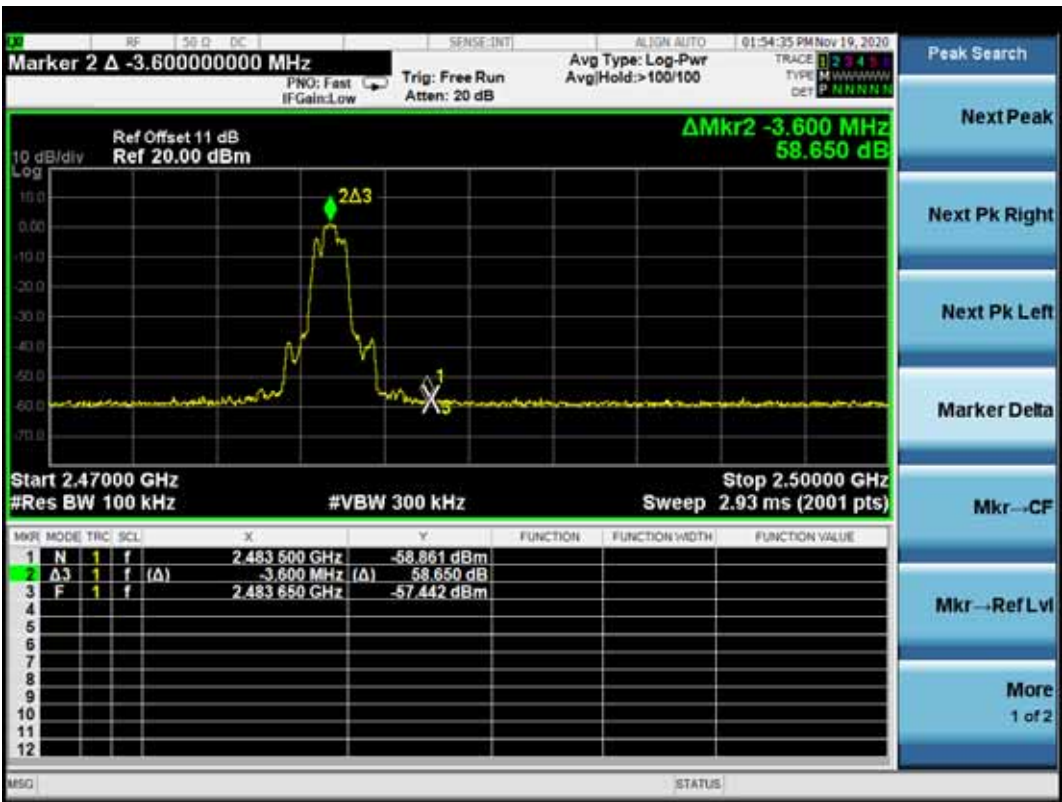
BT 3DH1: CH79 (2480 MHz)



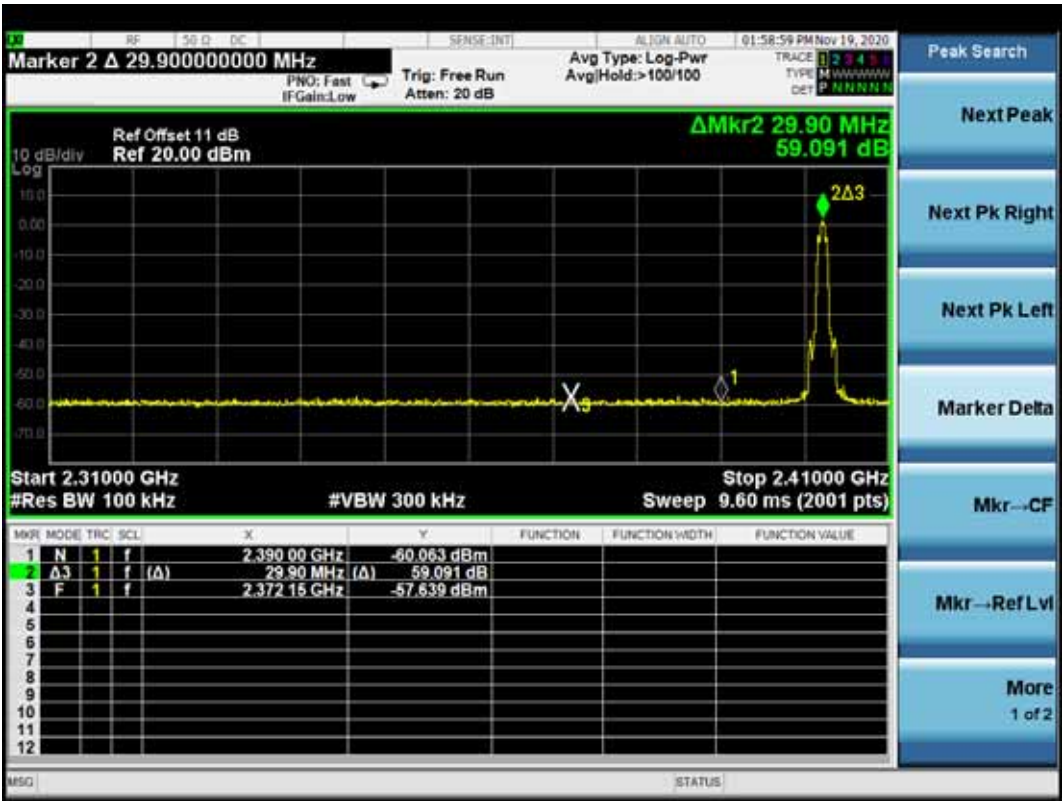
BT 3DH3: CH00 (2402 MHz)



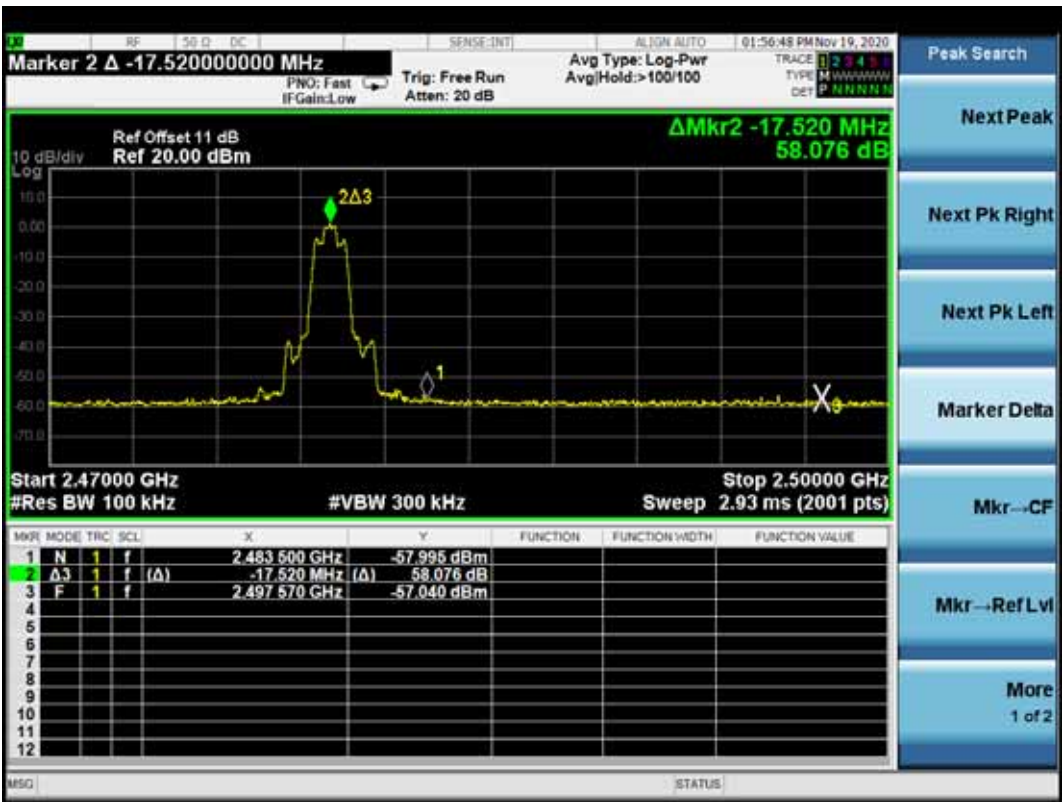
BT 3DH3: CH79 (2480 MHz)



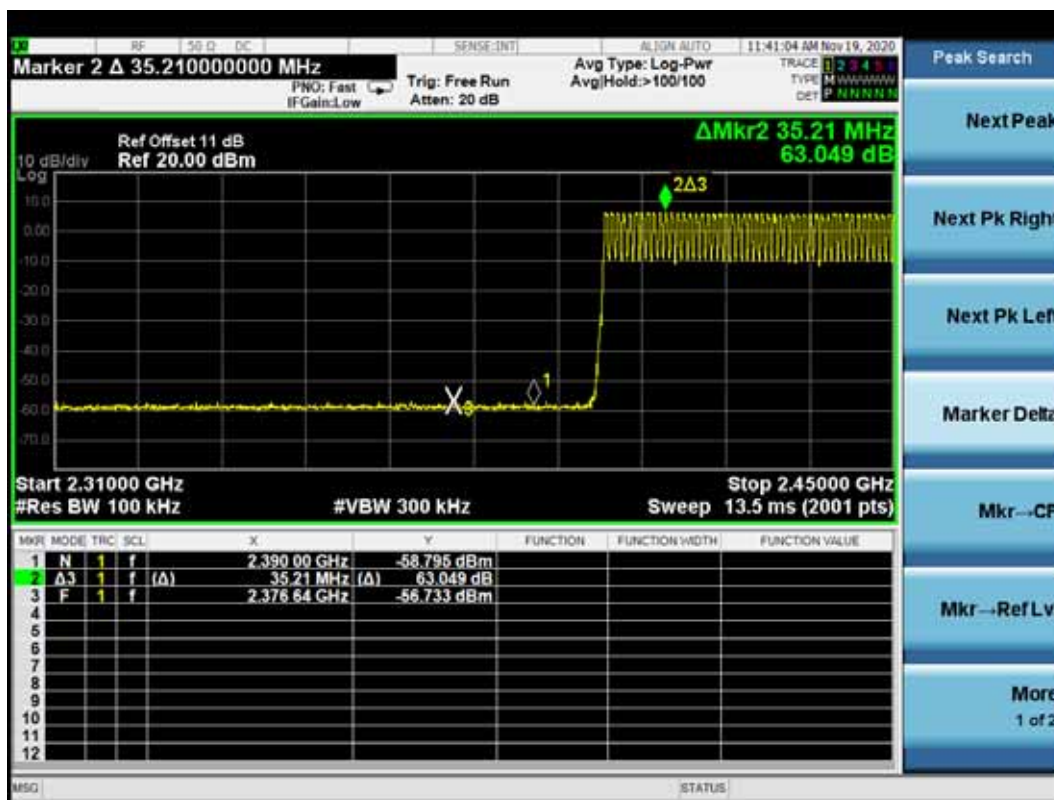
BT 3DH5: CH00 (2402 MHz)



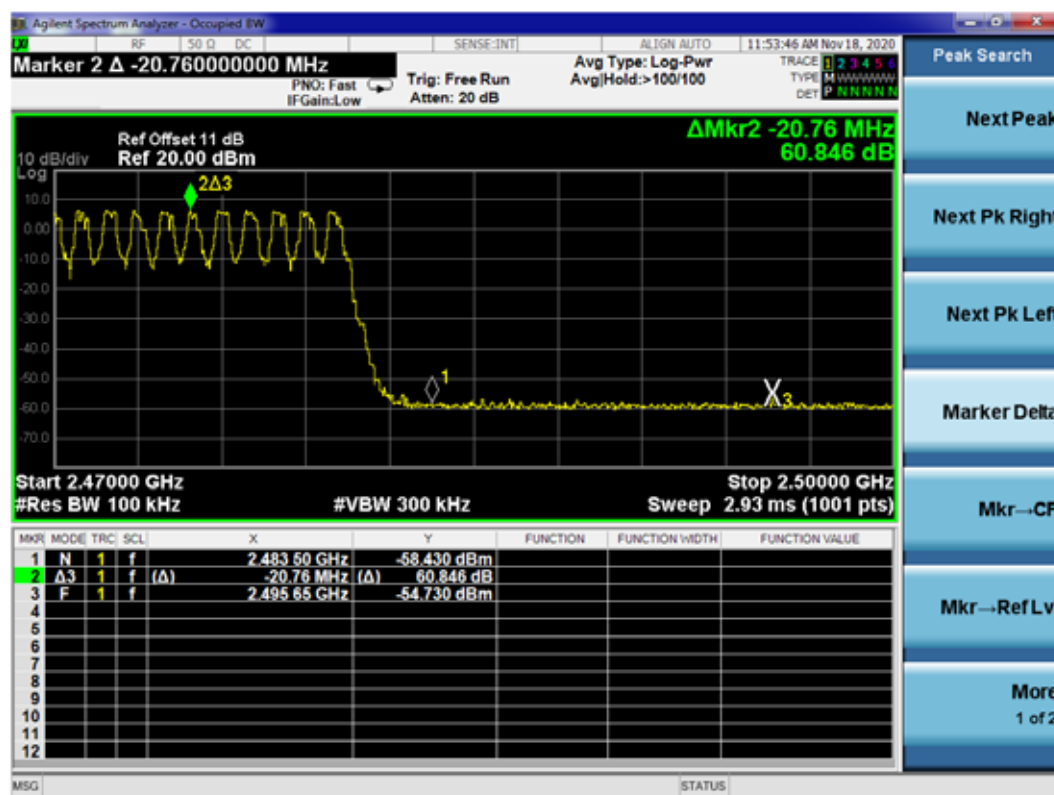
BT 3DH5: CH79 (2480 MHz)



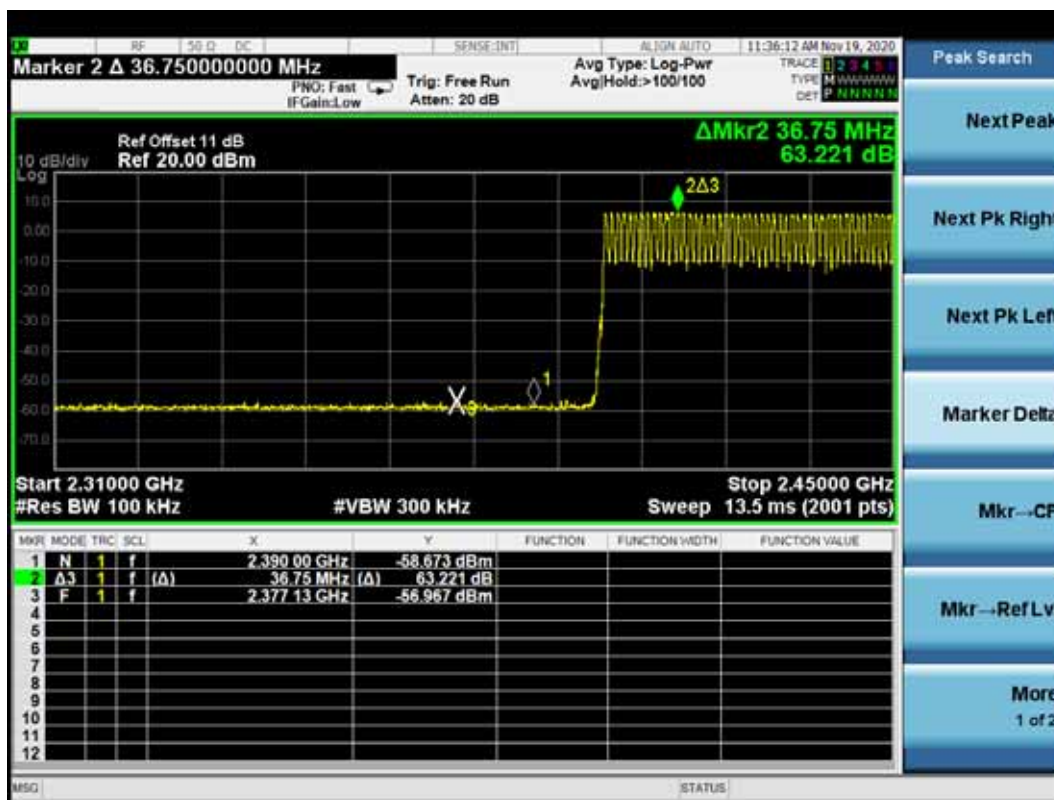
## BT DH1: Hopping (Lower edge)



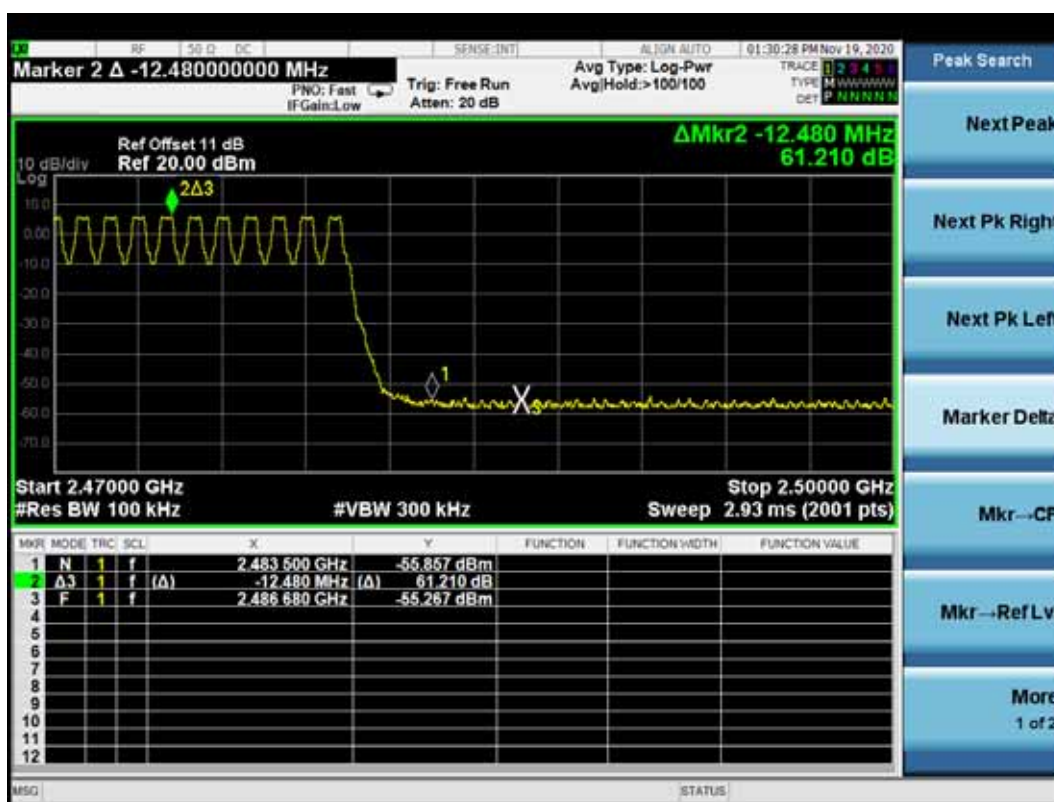
## BT DH1: Hopping (Upper edge)



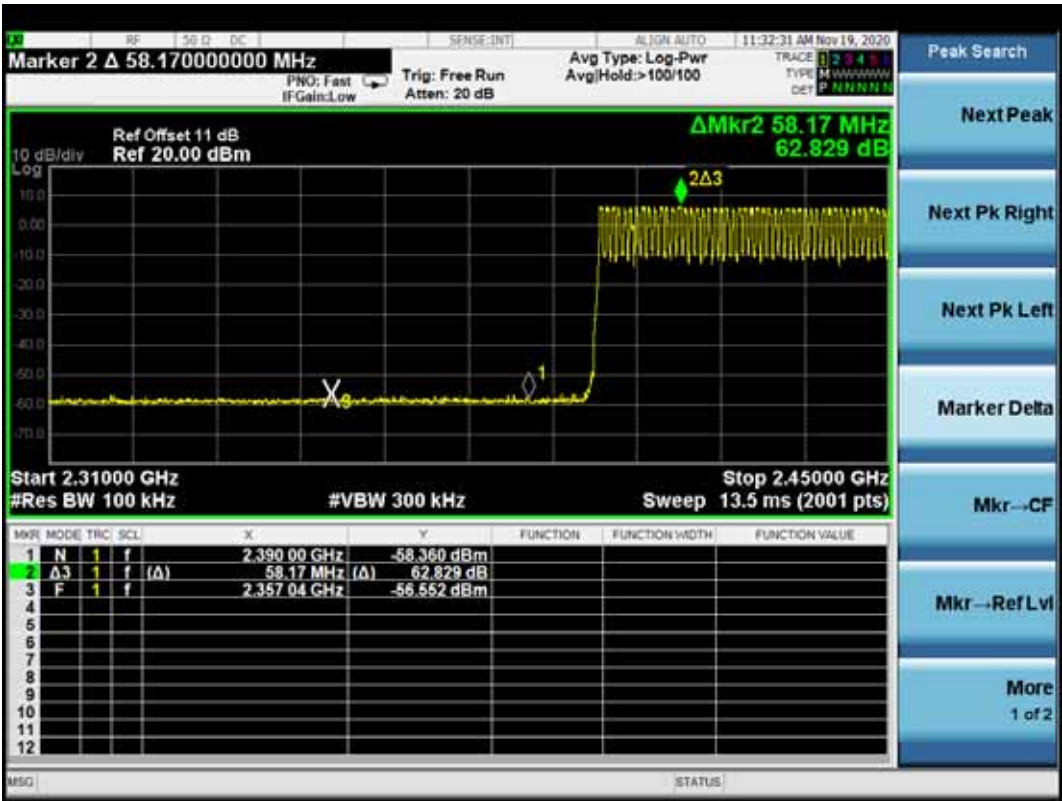
## BT DH3: Hopping (Lower edge)



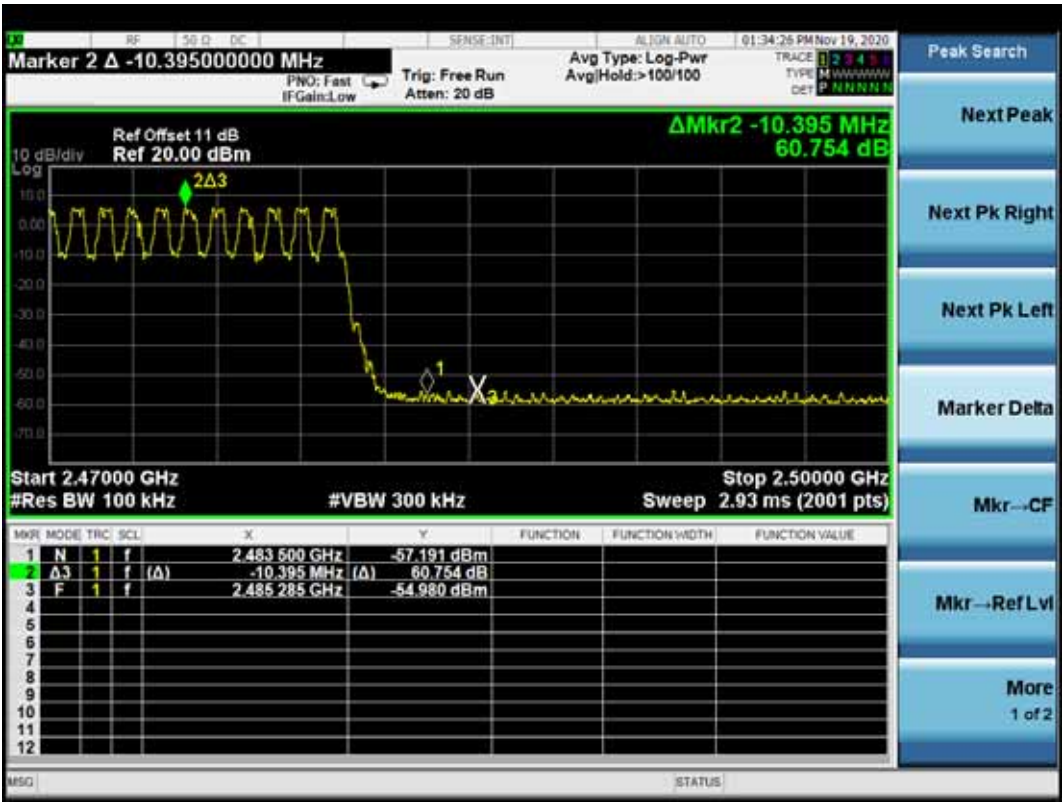
## BT DH3: Hopping (Upper edge)



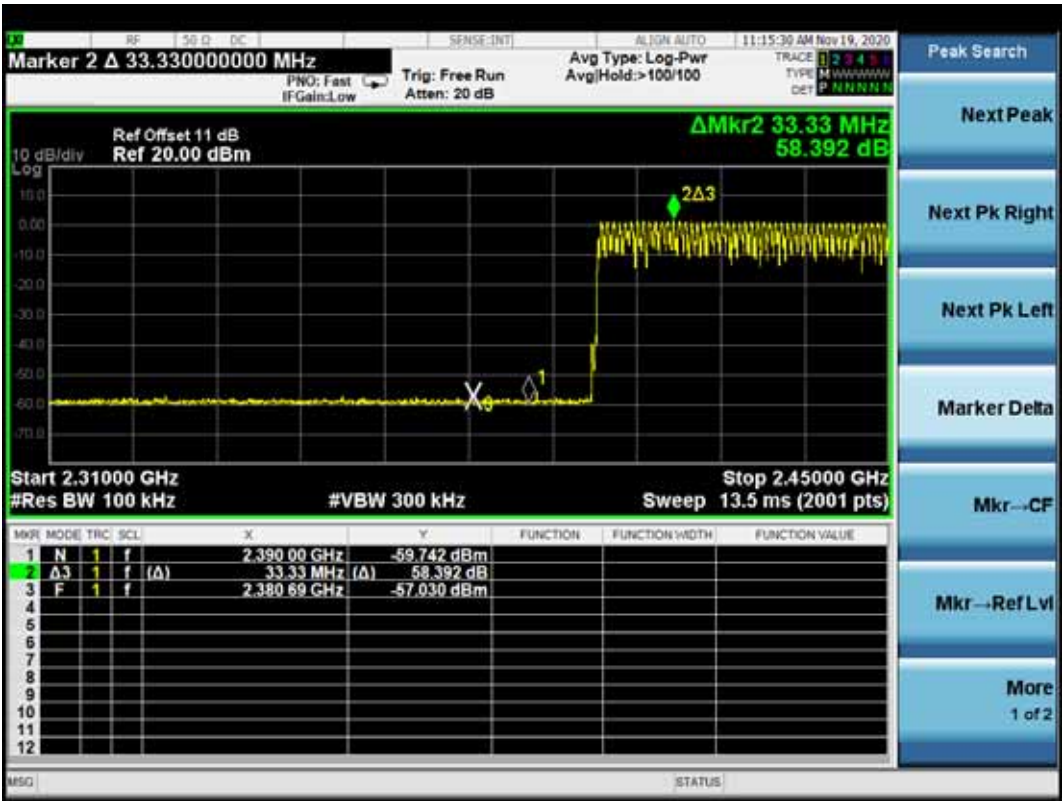
BT DH5: Hopping (Lower edge)



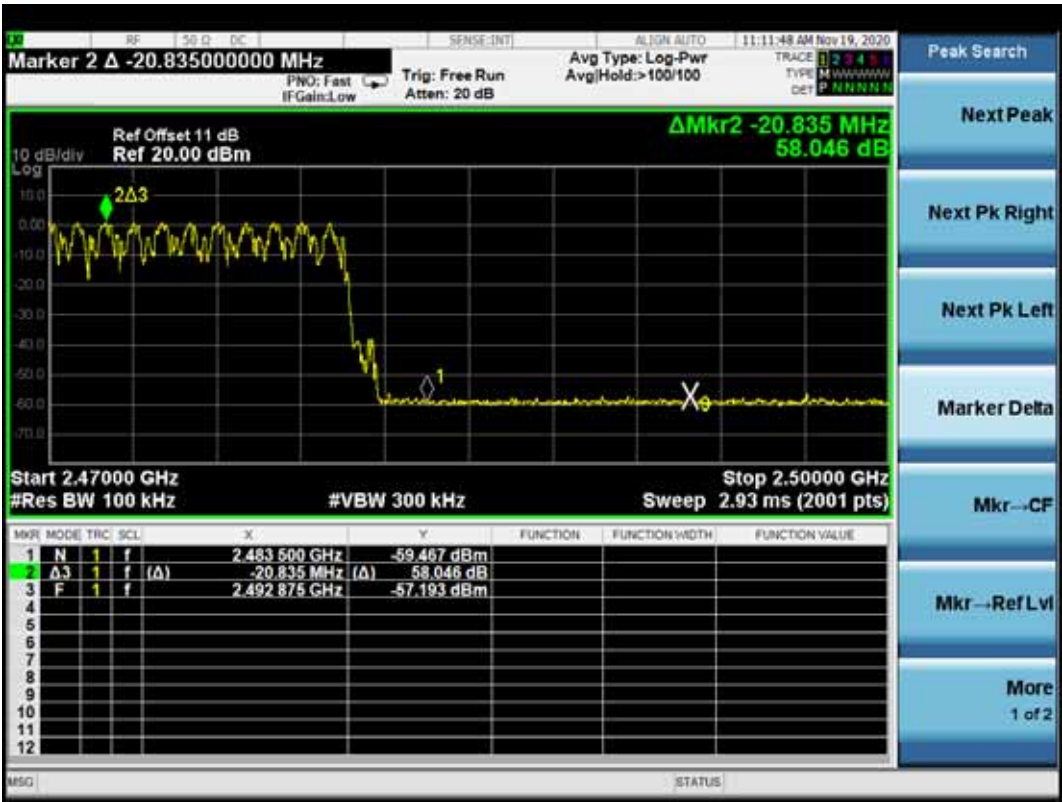
BT DH5: Hopping (Upper edge)



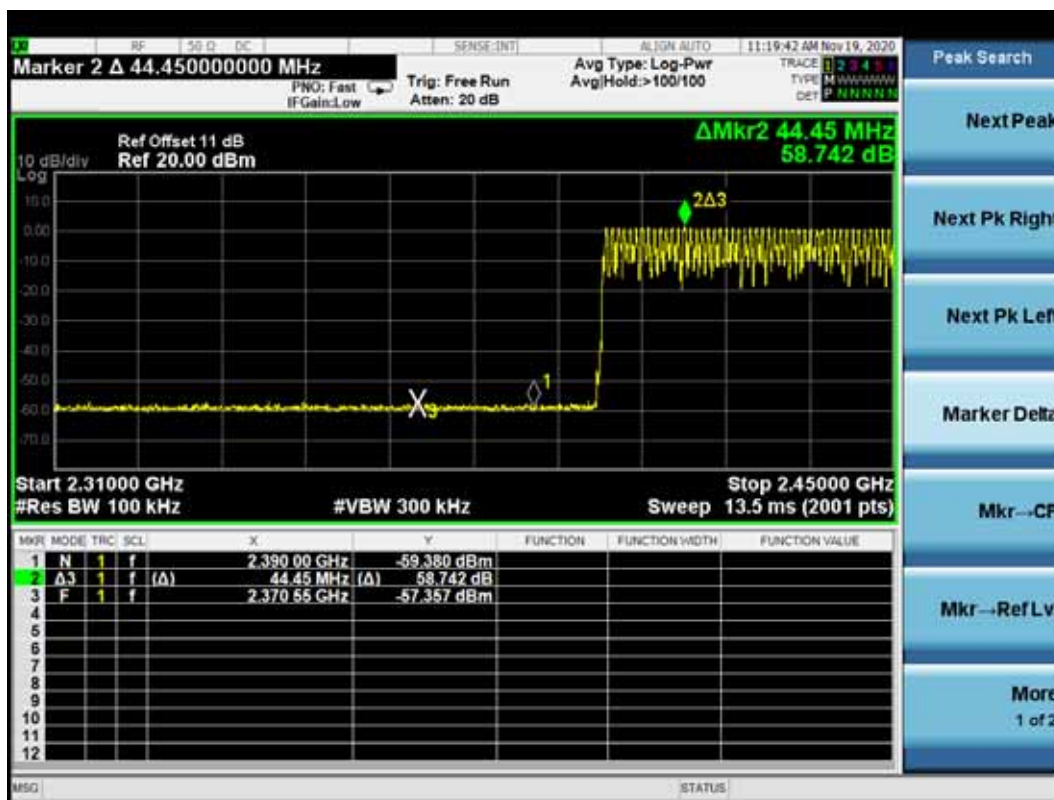
BT 3DH1: Hopping (Lower edge)



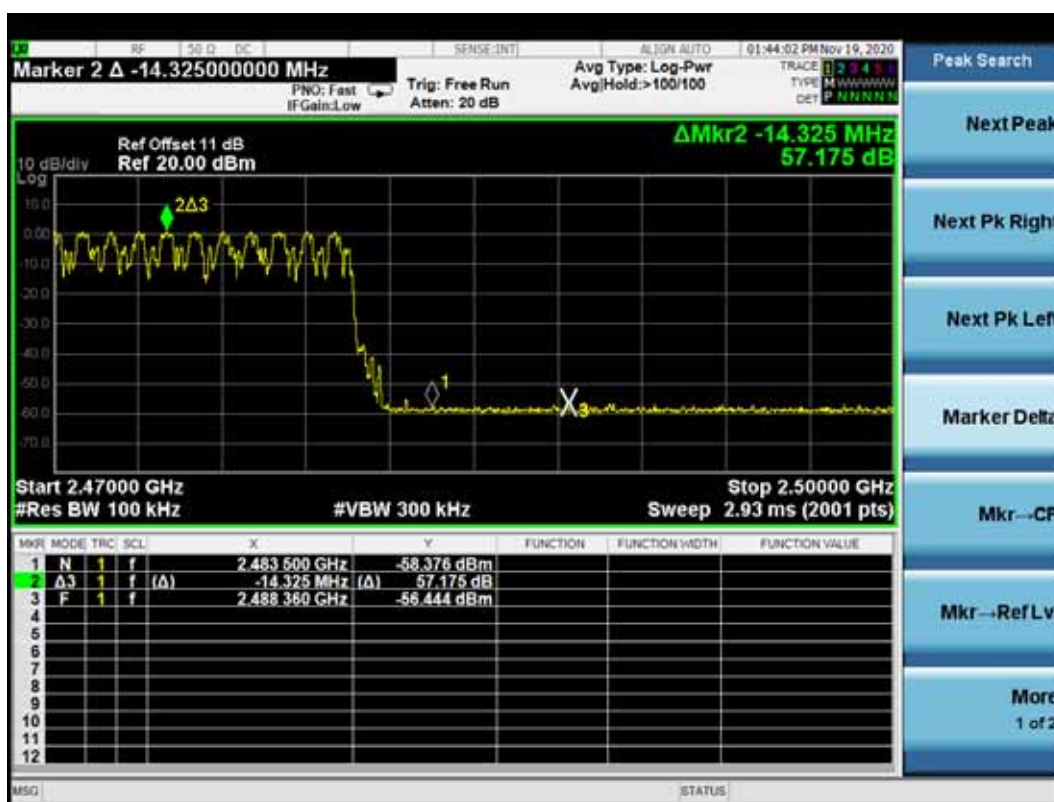
BT 3DH1: Hopping (Upper edge)



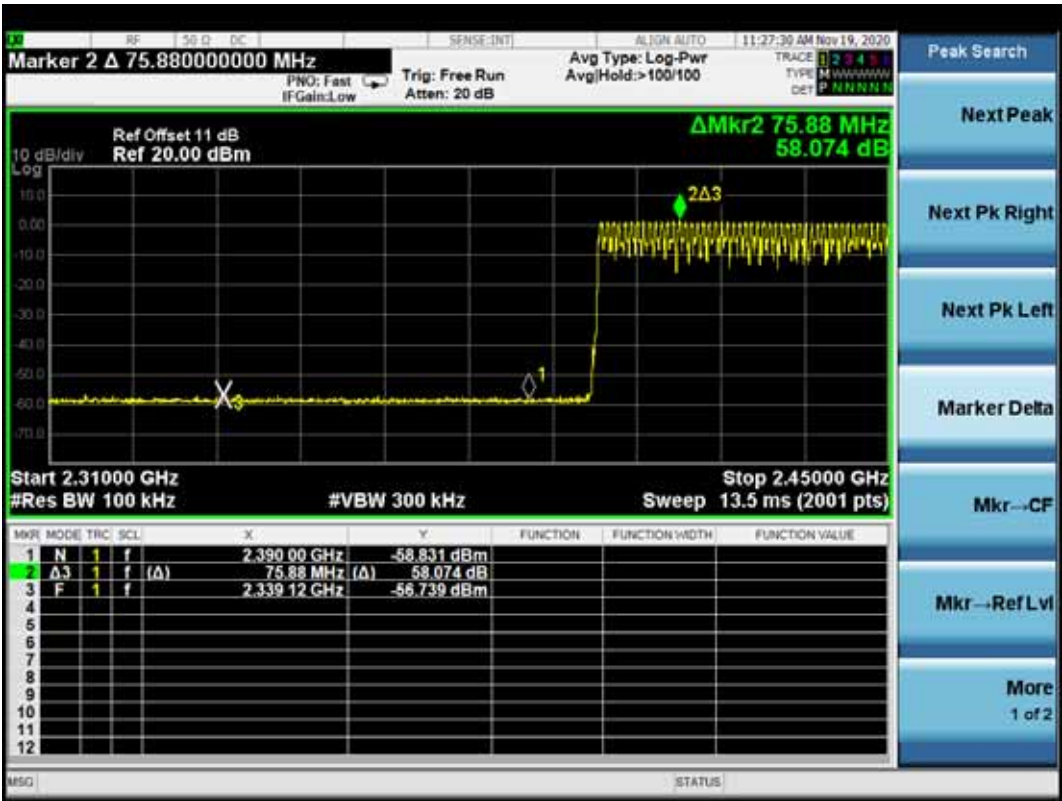
## BT 3DH3: Hopping (Lower edge)



## BT 3DH3: Hopping (Upper edge)



BT 3DH5: Hopping (Lower edge)



BT 3DH5: Hopping (Upper edge)

